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AUTHOR Delker, Paul V.
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ABSTRACT

This Contractor Report was prepared as background information for OTA's assessment: "Worker Training: Competing in the New International Economy." A review of workplace basic skills research and practice identified factors contributing to success. The review of the research defined workplace basic skills and found that: (1) there was a scant relationship between academic basic skill competence and job performance; and (2) requirements for job-related basic skills were best addressed in competency-based training programs. Eight field investigations were conducted to view current job-related basic skills programs. Programs studied were as follows: Plumley Companies; Aetna Institute for Corporate Education; South Carolina's Governor's Initiative for Work Force Excellence; Connecticut's State Education Department; New York's Employer Specific Skills Training Program; Houston Community College; Rockingham Community College; and Skills 2000. These programs were examined in terms of a figure with two axes--one representing a purely academic approach to basic skills designed to make the learner proficient in academic settings, another representing a purely job-related basic skills approach designed to make the worker proficient in quite specific workplace settings. The programs were found to illustrate the importance of four types of support: employer support, union support, state support, and federal support. Two major categories of interactive factors contributing to success or failure were identified in two major categories: learning system factors and support system factors. An "Executive Summary" of 11 pages precedes the full report. (YLB)

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BASIC SKILLS EDUCATION IN BUSINESS AND INDUSTRY

FACTORS FOR SUCCESS OR FAILURE

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Prepared by

Paul V. Delker
Strategic Educational Systems
May 1990

For

OFFICE OF TECHNOLOGY ASSESSMENT
CONGRESS OF THE UNITED STATES

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Summary

Before attempting to address factors contributing to success or failure in workplace basic skills programs, several prior questions have to be addressed: What are workplace basic skills? Do they differ significantly from academic basic skills? How are workplace basic skills best learned?

Job Basic Skill Requirements

Workplace basic skills differ from general or academic basic skills in level, frequency, and complexity. The general education development (GED) test, through which approximately a half million adults achieve high school equivalency certificates each year, measures academic readiness for post secondary education. Adults taking the GED can generally meet the reading requirements of the test if they read at a 10th grade level. Research by Sticht, Mikulecky, Diehl, and others concluded that "the vast majority of reading materials on the job ranged from 10th to 12th grade levels."1 Furthermore, in an examination of a representative cross section of occupations ranging from executive vice president to forklift driver, researchers found that only 2 percent of those occupations required no reading or writing. Time spent reading print, charts and graphs, and computer terminals averaged nearly 2 hours a day, with retail, service, and professional occupations averaging closer to 3 hours daily. Even blue collar workers averaged more than 90 minutes of job related reading daily.2

The amount of time spent by workers in reading, writing, and computing contrasts with that spent in school. At the high school level, students read approximately 98 minutes daily, including homework, an amount that approximately equals that required for blue collar workers but is only about half that averaged by retail, service, and professional workers. Furthermore, over 95% of student reading is from textbooks for the purpose of gathering literal facts, while 80% to 90% of worker reading is from forms, directions, manuals, labels, memos and notes, computer programs, tables, and schematics for the purpose of application, problem solving, and assessment.3 Mikulecky notes that "non-school reading calls for more complex levels of processing, and often uses more difficult materials than most learners encounter in class settings. These gaps of quantity and quality between schooling and workplace also exist for writing."4

Sticht characterizes workplace basic skills as reading, writing, computing-to-do versus the reading, writing, computing-to-learn of school or academic basic skills. This distinction -- first made by Sticht in 1975 in researching military occupations -- was confirmed in civilian settings by Diehl and Mikulecky in 1980 and is a useful paradigm for

distinguishing academic and workplace basic skills. Extending that paradigm, Mikulecky suggests that "metacognitive literacy skills are called for in the workplace. Among these skills are the abilities to:

- o ask questions,
- o monitor comprehension,
- o focus and anchor key ideas in memory, and
- o use information to plan and problem solve.

On the job, readers and writers usually have specific tasks, audiences, contexts, and problems to solve. They read and gather information and use their metacognitive skills regularly."5

Academic Basic Skills and Job Performance

The historical adult basic education program in this country has generally not recognized job basic skills as different or distinct from (academic) basic skills. As a program oriented to the individual, academic basic skills have understandably been seen as the proper domain of remedial adult education. After all, it was these generic basic skills that undereducated adults failed to get in school, and the proper remediation logically consisted of imparting those skills during the adult phase of life -- a "better late than never" solution. Those adults who did acquire academic basic skills through education during youth apparently functioned adequately in work and adult life. Therefore, if undereducated adults simply acquired these skills, it would follow that they too could then function adequately in work and adult life. Consistent with this line of reasoning, the GED format and the high school diploma have remained the principle constructs for attracting and teaching adults, especially at the higher levels of adult remedial education.

If this line of reasoning were correct, we would expect to find a high correlation between proficiency in academic basic skills and job performance. The better one performs on standardized tests -- including the GED -- the better that person should perform on the job. "The research suggests that there is a relationship, but that it is by no means overwhelming or direct."6

Studies attempting to demonstrate the relationship between generic or academic basic skills proficiency as measured by standardized tests and job performance "reveal scant, though statistically significant relationships." One study implies an overlap of job performance and tested reading ability of only 8% to 13%. In other studies, similarly low correlations were found among nurses and electronic workers.7 However, a much higher relationship was found "between job performance and higher order metacognitive and problem solving reading skills."8

Two corollary findings support the scant relationship between

generic or academic basic skill competence and job performance. "Military recruits given traditional basic skills training make gains while in class, but tend to revert and lose their skills within 8 weeks. In contrast, job related literacy and computational training does not suffer this reversion."9 Sticht reported that "personnel retained 80% of their end-of-course gain in job-related reading, but only 40% of their end-of-course gain in general reading."10

The second corollary finding relates to the importance of background knowledge in workers' abilities to comprehend work material. Diehl and Mikulecky reported workers able to read job material 1-2 grade levels more difficult than they were able to read general material.11 Sticht divided workers into four groups ranging from high background knowledge to low background knowledge. Low background knowledge workers needed a tested reading ability of 11.5 grade level to comprehend 11.3 grade material. High background knowledge workers, however, were able to comprehend the material with reading ability levels as low as 6th grade level.12

These and other data lead Sticht and Mikulecky to state: "in relation to job performance, it is considerably more important to apply basic skills in specific job situations than it is to demonstrate such skills on standardized tests."13

In summary, workplace basic skills are in general of a high level, required to be executed with greater frequency, and are more complex than those required of high school graduates with little or no adult life experience. While the generic or academic basic skills do have some relationship to workplace basic skill requirements, it is scant, and there is little transferability between academic basic skills and workplace applications. Those in the workplace who execute basic skills at a satisfactory level have learned most of them after leaving school -- most likely on the job through both experience and purposeful training.

Given these clarifications, it is not surprising that U.S. business and industry are finding the general workforce deficient in workplace basic skills.

This review and analysis of research can provide a framework for summarizing and clarifying essential differences between academic basic skills -- the kind developed through traditional adult basic education/GED instructional programs -- and workplace basic skills. Figure 1 provides a summary of these findings.

Utilizing Sticht's distinction, academic basic skills can be described as basic skills for **learning**, while workplace basic skills are skills for **doing**. The left hand axis of Figure 1 summarizes skills and behaviors of high school seniors while the right hand axis presents contrasting requirements in workplace

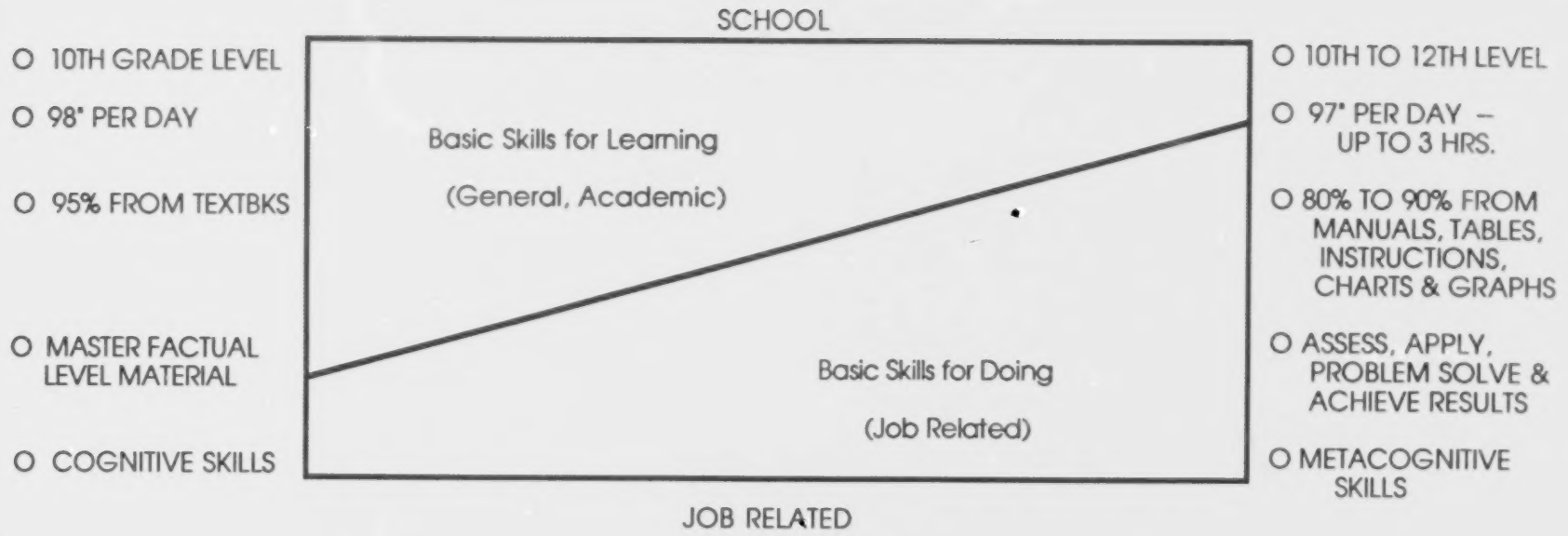
SCHOOL
O 10TH GRADE LEVEL
O 98° PER DAY
O 95% FROM TEXTBKS
O MASTER FACTUAL LEVEL MATERIAL
O COGNITIVE SKILLS
Basic Skills for Learning
(General, Academic)
Basic Skills for Doing
(Job Related)
O 10TH TO 12TH LEVEL
O 97° PER DAY – UP TO 3 HRS.
O 80% TO 90% FROM MANUALS, TABLES, INSTRUCTIONS, CHARTS & GRAPHS
O ASSESS, APPLY, PROBLEM SOLVE & ACHIEVE RESULTS
O METACOGNITIVE SKILLS
JOB RELATED

Figure 1

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basic skills. This contrasting analysis confirms that workplace basic skills are of a higher level, are required to be exercised more frequently, and are more complex than the basic skills developed through high school programs and their equivalency. Mikulecky points out that "metacognitive literacy skills are called for in the workplace. Among these skills are the abilities to: ask questions, monitor comprehension, focus and anchor key ideas in memory, and use information to plan and problem solve. On the job, readers and writers usually have specific tasks, audiences, contexts, and problems to solve. They read and gather information and use their metacognitive skills regularly."14

The framework displayed in Figure 1 is further developed in Figures 2 through 7 by identifying 6 program "zones." Through an analysis of existing programs, each zone classifies an area of practice based on two elements: curriculum content and methodology, and types of assessment instruments and techniques. In Figure 2, Zone 1 contains traditional ABE and GED curricula designed to teach general basic skills to adults, utilizing cognitive skill-building curricula and standardized normative tests including the GED examination. Zone 1 represents the traditional and dominant basic skills programs for adults designed to develop proficiency in academic skills equivalent to a high school graduate.

In Figure 3, Zone 2 also represents traditional high school equivalency programs; however, in this zone innovative teachers supplement the high school equivalency content and format with real life problems and materials (such as sale adds or help wanted notices in the newspaper). Still in zone 2 but slightly more related to the workplace are computational problems and job reading materials generic to the work area or even specific to an individual's work station. However, at this point, <u>these materials and problems are not used as the organizing principle for the sequential development of basic skills, only as supplements to the traditionally formatted sequence for learning academic basic skills.</u>

Displayed in Figure 4, Zone 3 represents programs in which job and life requirements are used as the organizing principle in curriculum development. Programs in this zone do not follow the traditional skill-building pattern of the high school equivalency format. At this point, basic skills for doing replaces basic skills for learning. Work and real-life competencies in domains such as statistical process control, interpreting work manuals, consumer economics, health, parenting, getting a job, using community resources, and understanding government and law, are the <u>what</u> to be learned, and they are learned by applying basic skills in situations related to these domains. From a curriculum viewpoint, programs in zone 3 meet the learning requirements of the workplace if the learning settings and applications are primarily work contextual. However, as most often encountered in

PROGRAM ZONES

- o COGNITIVE SKILL CURRICULA
- o STANDARDIZED TESTS

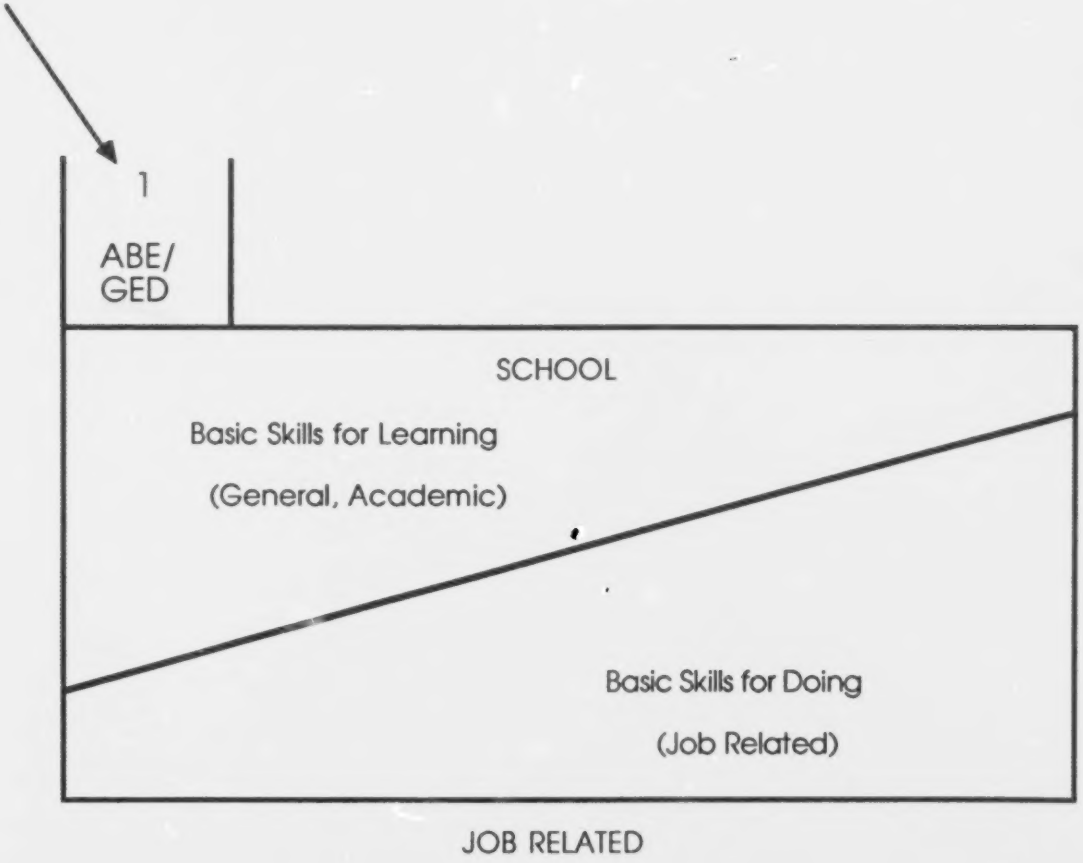

Figure 2

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PROGRAM ZONES

- o #1 PLUS JOB & LIFE RELATED MATERIALS & PROBLEMS
- o STANDARDIZED TESTS

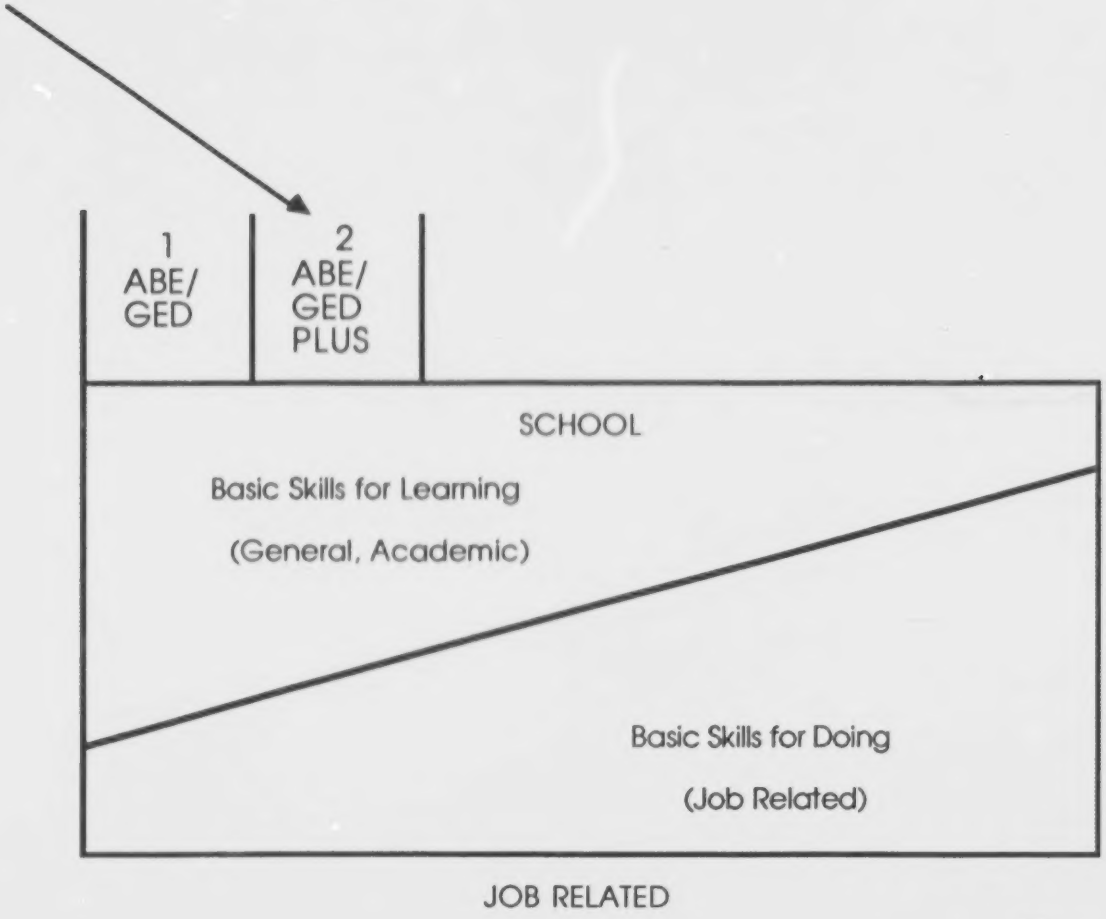

Figure 3

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programs studied, they fall short in using standardized normative tests designed to measure proficiency in academic basic skills. Thus, from a workplace effectiveness perspective, they would be graded "A" for curriculum content but "F" for testing and assessment. On the one hand, zone 3 programs teach skills for doing, but they measure only skills for knowing. To measure something different from what is learned is dysfunctional. It may denigrate what has been learned and falsely assess what needs to be learned.

Zone 4 is made up of programs that identify, assess and teach life competencies. In curriculum content and methodology they may be identical to programs in zone 3, but they use criterion referenced assessment instruments and techniques to diagnose learner needs, monitor learning progress, and to verify that the needed basic skill competencies have been mastered. As categorized here, zone 4 programs do not attempt to address specific job related needs, although existing programs in zone 4 typically address competencies required to find and obtain jobs and to function safely in work environments.

Zone 5 programs are identical to zone 4 except in content and applications. Zone 5 programs teach generic workplace basic skills in work contexts, using criterion referenced assessment for diagnosing learning needs, monitoring progress, and verifying that the required basic skill competencies have been mastered. Finally, programs in zone 6 closely resemble those in 5 except that the content is directed to mastering competencies related to performing specific jobs and tasks.

In Figure 7, program zones 4, 5, and 6 are designated "competency based." A few words of clarification are in order. This phrase has been in common use among adult basic educators since the late 1970s. It is incorporated in a section of the American Association of Adult and Continuing Education (AAACE) as the Competency Based Adult Education (CBAE) unit. CBAE attracts and supports adult educators practicing in zones 2 through 6. From a curriculum and instructional point of view, this is a legitimate use of the term "competency based." However, from a total learning system perspective -- the one treated here -- programs in zones 2 and 3 are not competency based because of the absence of criterion referenced assessment techniques and instruments for diagnosing, monitoring, and verifying mastery of basic skill competencies.

Next, programs visited or described in this study are classified by zones and thereby according to their effectiveness in delivering workplace basic skills training. The preponderance of programs studied fall into zones 1, 2, and 3. Only a few programs address zones 4, 5, and 6, the zones of optimal effectiveness for delivering workplace basic skills. Because zone 6 programs are targeted to basic skills required to perform specific jobs and tasks, the transferability of what is learned

PROGRAM ZONES

- o WORK CONTEXTUAL
- o STANDARDIZED TESTS
- o MAY NOT FOLLOW GED FORMAT

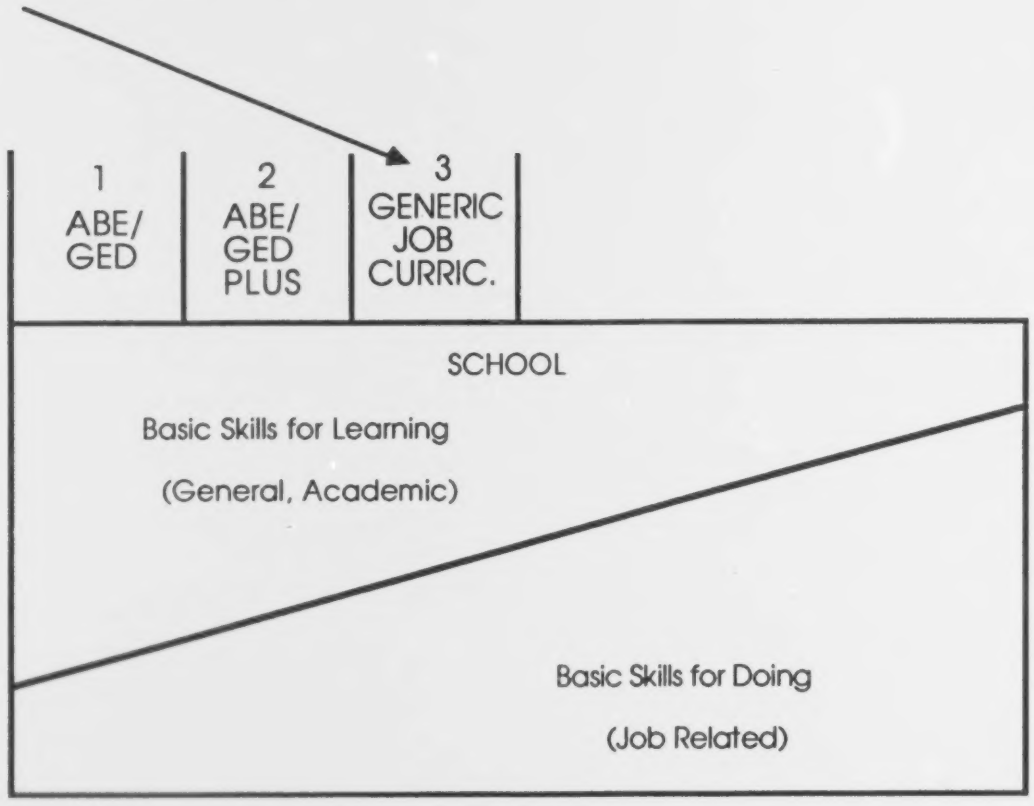

Figure 4

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PROGRAM ZONES

- o MEASURABLE ADULT COMPETENCIES
- o CRITERION-REFERENCED ASSESSMENT
- o VARIGATED CURRICULUM

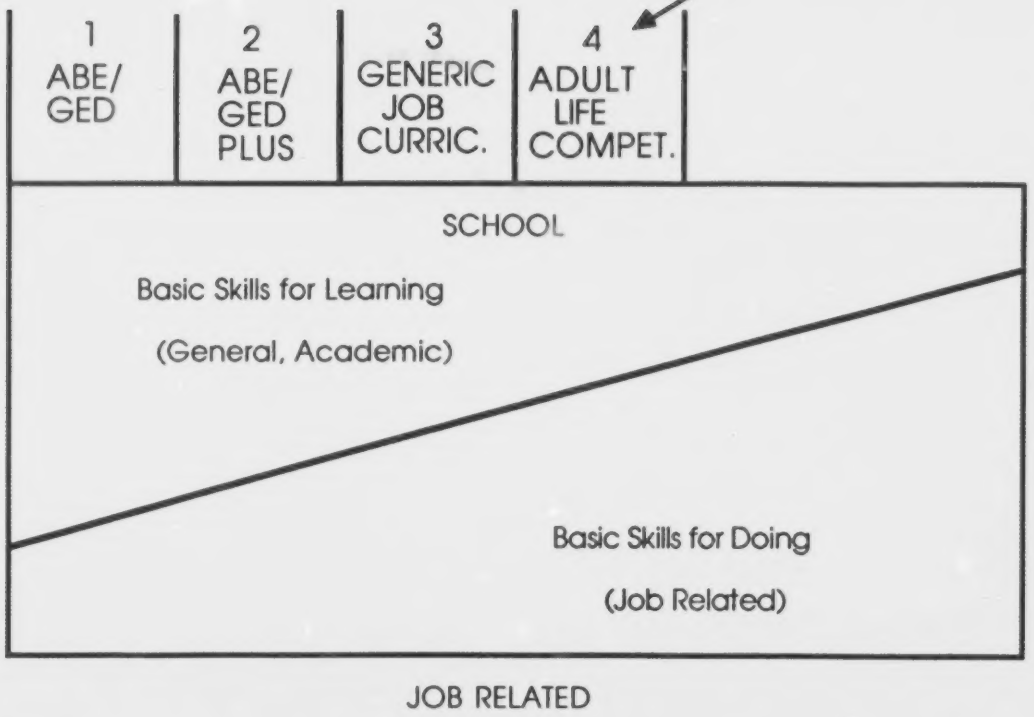

Figure 5

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PROGRAM ZONES

- o MEASURABLE WORKPLACE COMPETENCIES
- o CRITERION-REFERENCED ASSESSMENT
- o WORKPLACE CURRICULUM

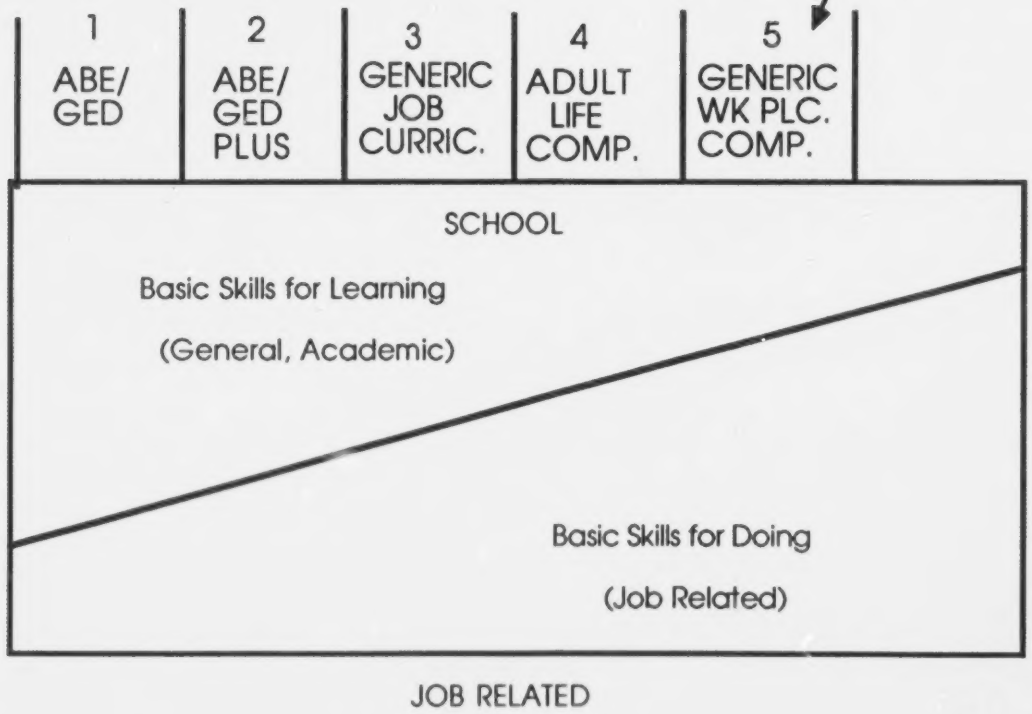

Figure 6

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PROGRAM ZONES

- o MEASURABLE JOB COMPETENCIES
- o CRITERION-REFERENCED ASSESSMENT
- o JOB SPECIFIC CURRICULUM

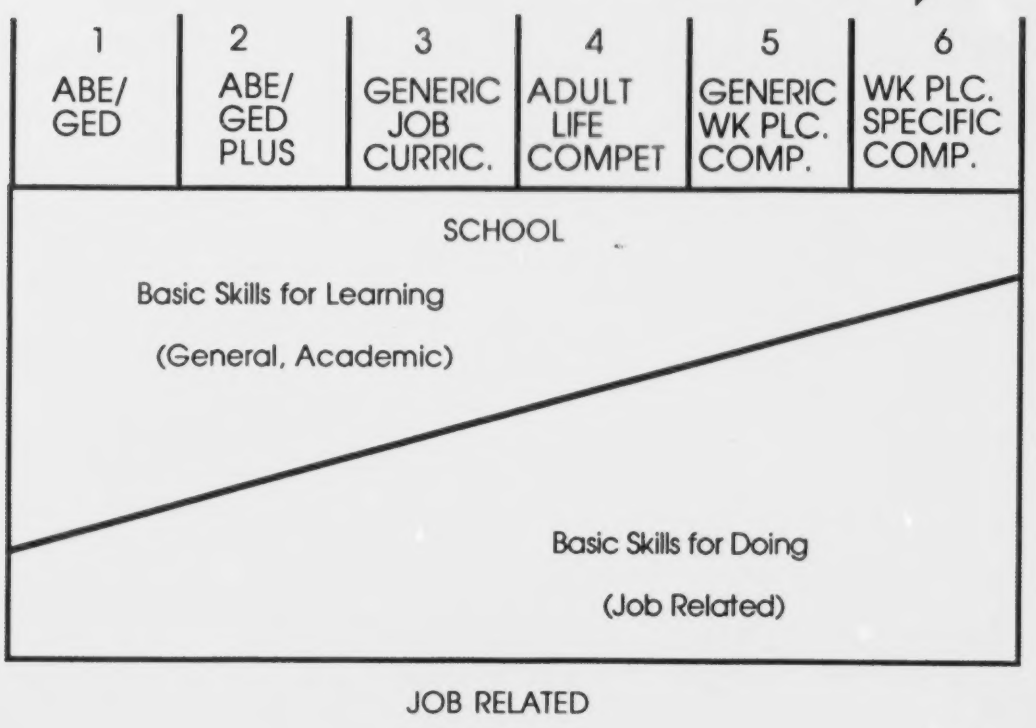

Figure 7

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appears to be limited. Thus, the optimal programs for most purposes are those in which learners apply metacognitive skills to combinations of generic work and life problems -- zones 4 and 5. Skills learned in these domains can be applied continuously in work and life situations, an important factor in retaining and extending the application of those skills.

The fundamental objectives of generic or academic basic skills programs and those of job related programs are not the same. It is appropriate that general adult basic skills programs continue to focus on the individual learner and his or her learning goals. The primary goal is and should remain the development of the individual. In job related programs, on the other hand, the mission and goals of the organization are a primary concern, and may dictate the content of learning, especially if all or most of the training costs are borne by that organization. This is not to say that the development of the individual and the goals of the organization are antithetical. Increasingly, business and industrial organizations are adopting an enlightened perspective on the long term benefits accruing from a workforce of highly developed employees. In the shorter term, however, the context for that development is often dictated by technological change, customer requirements, and competition. The organization thus becomes the primary client and the learner the secondary one. The primary goal is to have a well qualified workforce so that the mission of the organization can be carried out. At times, individual learner goals may have to be sublimated to those required to further the organization.

This fundamental shift from an individually oriented learning program to an organizationally driven one is not readily understood by many adult educators. Accepting the organization as the primary client implies a fundamental shift from an educational context (one essentially established and controlled by the teacher) to a functional job context. Even adult basic education programs dedicated to increasing the learner's functional generic competence may not readily recognize the changes required, although in those cases, the shift is far less radical. The functional context principle confirms that skills and knowledges are best learned when they are presented in a context that is meaningful to the learner. This means the basic skills program should use job reading and computation materials and tasks to the maximum feasible extent. But accepting the organization as the primary client also means that the primary criterion for judging learning effectiveness is improved job performance. Although this presents new complexities for effective evaluation of results, it compels adult educators and trainers to more effectively simulate actual job requirements. "The more similar the basic skills training tasks are to the actual job tasks, the greater will be the likelihood that the training will pay off in improved performance of job literacy tasks."15

The complexity of using basic skills "to do" -- to make assessments, solve problems, accomplish tasks, and get specified results -- requires active learning. Sticht and Mikulecky stress the importance of "understanding the person as an information processing system that develops new capabilities over time using prior knowledge and skills as the means for acquiring new knowledge and skills." This has significant implications for instructional and curriculum design. Instruction needs to be designed around active information seeking and processing using job-related functional basic skills in tasks such as learning how to locate information in job manuals, and how to manipulate information actively to produce matrices and flowcharts.16 Each trainee should be actively engaged in learning tasks for the greatest amount of time possible.

These requirements for job related basic skills are best addressed in competency based training programs. These programs address two main ideas. First, what is learned should be derived from the learner's occupational setting and the learning outcomes should be stated and measured in terms of acquiring the basic skill competencies needed to perform the job tasks. Secondly, the learning culminates in demonstrated mastery. In job related basic skills programs, it should be possible to set the standard of mastery at 100%, i.e. all trainees should be able to master 100% of the basic skills competency required for job performance.17

In summary, job related basic skills are best learned in programs designed on the following:

- The organization, its goals and mission, are recognized as the primary client.
- The instructional system design is competency-based mastery learning and the skills and knowledges taught and mastered relate to the work setting.
- Training is conducted with the maximum feasible use of job reading and computation materials and tasks.
- The person is understood as an information processor whose skills and knowledge increase most rapidly by being actively engaged in learning tasks.

The analysis of program zones addressing workplace and academic basic skills can provide training design criteria for assessing successful job related basic skills programs. A job related basic skills program is first and foremost a learning program for workers employed in a specific setting. If it is to be most successful, it will meet all the criteria of a workplace competency based system.

However, a program may meet the identified criteria and not be as successful as it should be because of factors external to the training program itself. For example, it may aspire to incorporate all the design elements but fail to achieve its goal because of lack of resources. Or, a well designed and executed

training program may be thwarted by logistical barriers such as transportation and scheduling or by political realities between management and union. Conversely, training programs that fall short in incorporating all the desirable elements may experience more success than expected because of positive external factors. For example, company commitment to and support for education and learning may motivate workers to achieve greater gains than would otherwise be the case. Thus, in assessing factors contributing to the success or failure of job related basic skills programs, those relating to sound educational design must be considered in conjunction with factors extraneous to the learning setting itself.

These realities led to an analysis of supportive roles of four external support systems: employers, unions, state governments, and the federal government. Learning system factors and support system factors contributing to success or failure are then summarized in two scenarios -- a best case and a worst case.

The Best Case

LEARNING SYSTEM FACTORS

- o Competency based curriculum

  -- Teaches basic skills for doing
  -- Work and life basic skill competencies
  -- Specific job basic skill competencies as required
  -- Curriculum and materials are from job and life contexts

- o Criterion referenced assessment

  -- Measures work and life basic skill competencies already acquired
  -- Monitors progress in new basic skill competencies learned
  -- Verifies mastery of required basic skill competencies

- o Learner centered instruction

  -- Individual counselling and regular feedback
  -- Flexible instructional format: individual, group, etc.
  -- Variegated curriculum using print, instructional technology, simulations, etc.
  -- Learning format accommodates individual learning styles

SUPPORT SYSTEM FACTORS

- o Employer/Union Roles

  -- The learning culture an essential element of work
  -- Learning important to quality, competitiveness, and job security
  -- Release time for learning basic skills
  -- Instruction on premises in suitable facility
  -- Continual promotional program using publicity, awards, certification, and recognition.

- o State Roles

  -- Formula funding to support workplace basic skills programs
  -- Special population funds for qualified providers
  -- Workplace basic skills linked with economic development initiatives
  -- State leadership at all levels seek to meet employer basic skill needs

- o Federal Roles

  -- Workplace basic skills a national concern
  -- Supports aggressive research and demonstration program to improve knowledge and practice
  -- Supports a system of evaluation, diffusion, and adoption of improved practices and products

This best case scenario represents an ideal, but not an unachievable one. All the learning system factors delineated exist in practice today but are rarely brought together in a single program. Employer/Union and State role models exist and can be replicated widely. Current proposed federal legislation seriously addresses the required federal roles.

The Worst Case

LEARNING SYSTEM FACTORS

- o Traditional high school equivalency content and format
  - -- Teaches basic skills for learning
  - -- Traditional subject matter content
  - -- No job or life related materials introduced
- o Standardized, normative testing
  - -- Ranks workers in relation to children and youth in school
  - -- Verifies primarily one's ability to learn at post-secondary education level
- o Teacher centered instruction
  - -- Traditional teacher/learner relationship without individual counselling and feedback
  - -- Group classroom format only one available
  - -- Single standard curriculum
  - -- No recognition of individual learning styles

SUPPORT SYSTEM FACTORS

- o Employer/Union Roles
  - -- GED preparatory program only available basic skills instruction
  - -- Offered for individual's development and satisfaction
  - -- No clear relationship to quality, competitiveness, and job security
  - -- Conducted on employee's own time
  - -- Minimal publicity; no proactive promotional campaign
  - -- Little or no recognition of successful completion
- o State Roles
  - -- No formula funding to support workplace basic skills programs
  - -- What funds available channeled through traditional educational institutions lacking experience in serving employers

-- Economic development measures separate or non-existent
-- State leadership measures accomplishments only in terms of high school equivalences awarded

o Federal Roles

-- Workplace basic skills a state problem
-- No federal support for research and demonstration to improve knowledge and practice in workplace basic skills
-- No support to evaluate, diffuse, and adopt best practices and products

Unfortunately, the worst case is both achievable and quite common. Usually well intentioned, such efforts languish and often die because of lack of learner response. Typically, a program approaching the worst case scenario will attract a small class of learners whose personal or career aspirations are supported by high school certification. Beyond that, employers will ask how to motivate others, and eventually abandon the program because of lack of interest. Employees' silence is significant, but educators and employers do not understand why the program offered is not viewed as relevant to their work needs.

Success in workplace basic skills must be judged in terms of what is learned and by how many in need. Assessing the "what is learned" requires valid and reliable criterion referenced -- i.e. job and life related -- measures. While these do exist, they are not widely in use. Until they are, reliable measures confirming that the kinds of workplace basic skills needed are in fact learned will not be forthcoming. As a result, other estimates of success -- some of which may be valid -- are often used. These include anecdotal data on changes in employee behavior, rates of employee participation, and judgments that basic skills instruction was a factor in improved efficiency and productivity. If employers and educators feel those data are sufficient, the program is considered "successful." It may in fact be cost effective judged against the consequences of doing nothing -- loss of quality, market share, and jobs. However, in building a successful workplace basic skills system, both policy makers and educators must strive to be as quality conscious and cost effective as the workplace itself. Valid and reliable measures of what is learned are the educator's "SPC." They must form and maintain a quality workplace basic skills learning system.

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I

WHAT ARE JOB RELATED BASIC SKILLS?

In attempting to assess the current relationship of workplace basic skills and competitiveness, it is important to be clear about what we mean by basic skills. Historically, we have given very little attention to basic skills required for hourly production and service workers until the decade of the 80s; thus, our understanding of what we mean by basic skills is not sharply defined. While assumptions about what we include in the terms are commonplace, there is little consensus on what to include as basic skills, much less a precision about its components.

Systematic efforts to provide basic skills education for all needy adults in this country are less than 25 years old. Those efforts have been based principally on a body of practice rather than on a storehouse of research knowledge about how adults learn and how basic skills are best taught. During those years, very little attention has been paid to workplace basic skills, in either practice or research. Thus, several essential questions need to be addressed: What are workplace basic skills? Do they differ significantly from academic basic skills? How are workplace basic skills best learned?

Job Basic Skill Requirements

Workplace basic skills differ from general or academic basic skills in level, frequency, and complexity. The general education development (GED) test, through which approximately a half million adults achieve high school equivalency certificates each year, measures academic readiness for post secondary education. Adults taking the GED can generally meet the reading

requirements of the test if they read at a 10th grade level. Research by Sticht, Mikulecky, Diehl, and others concluded that "the vast majority of reading materials on the job ranged from 10th to 12th grade levels."1 Furthermore, in an examination of a representative cross section of occupations ranging from executive vice president to forklift driver, researchers found that only 2 percent of those occupations required no reading or writing. Time spent reading print, charts and graphs, and computer terminals averaged nearly 2 hours a day, with retail, service, and professional occupations averaging closer to 3 hours daily. Even blue collar workers averaged more than 90 minutes of job related reading daily.2

The amount of time spent by workers in reading, writing, and computing contrasts with that spent in school. At the high school level, students read approximately 98 minutes daily, including homework, an amount that approximately equals that required for blue collar workers but is only about half that averaged by retail, service, and professional workers. Furthermore, over 95% of student reading is from textbooks for the purpose of gathering literal facts, while 80% to 90% of worker reading is from forms, directions, manuals, labels, memos and notes, computer programs, tables, and schematics for the purpose of application, problem solving, and assessment.3 Mikulecky notes that "non-school reading calls for more complex levels of processing, and often uses more difficult materials than most learners encounter in class settings. These gaps of quantity and quality between schooling and workplace also exist for writing."4

Sticht characterizes workplace basic skills as reading,

writing, computing-to-do versus the reading, writing, computing-to-learn of academic basic skills. This distinction -- first made by Sticht in 1975 in researching military occupations -- was confirmed in civilian settings by Diehl and Mikulecky in 1980 and is a useful paradigm for distinguishing academic and workplace basic skills. Extending that paradigm, Mikulecky suggests that "metacognitive literacy skills are called for in the workplace. Among these skills are the abilities to:

- o ask questions,
- o monitor comprehension,
- o focus and anchor key ideas in memory, and
- o use information to plan and problem solve.

On the job, readers and writers usually have specific tasks, audiences, contexts, and problems to solve. They read and gather information and use their metacognitive skills regularly."5

Academic Basic Skills and Job Performance

The historical adult basic education program in this country has generally not recognized job basic skills as different or distinct from (academic) basic skills. As a program oriented to the individual, academic basic skills have understandably been seen as the proper domain of remedial adult education. After all, it was these generic basic skills that undereducated adults failed to get in school, and the proper remediation logically consisted of imparting those skills during the adult phase of life -- a "better late than never" solution. Those adults who did acquire academic basic skills through education during youth apparently functioned adequately in work and adult life. Therefore, if undereducated adults simply acquired these skills, it would follow that they too could then function adequately in

work and adult life. Consistent with this line of reasoning, the GED format and the high school diploma have remained the principle constructs for attracting and teaching adults, especially at the higher levels of adult remedial education.

If this line of reasoning were correct, we would expect to find a high correlation between proficiency in academic basic skills and job performance. The better one performs on normative, standardized tests -- including the GED -- the better that person should perform on the job. "The research suggests that there is a relationship, but that it is by no means overwhelming or direct."6

Studies attempting to demonstrate the relationship between generic or academic basic skills proficiency as measured by standardized tests and job performance "reveal scant, though statistically significant relationships." One study implies an overlap of job performance and tested reading ability of only 8% to 13%. In other studies, similarly low correlations were found among nurses and electronic workers.7 However, a much higher relationship was found "between job performance and higher order metacognitive and problem solving reading skills."8

Two corollary findings support the scant relationship between generic or academic basic skill competence and job performance. "Military recruits given traditional basic skills training make gains while in class, but tend to revert and lose their skills within 8 weeks. In contrast, job related literacy and computational training does not suffer this reversion."9 Sticht reported that "personnel retained 80% of their end-of-course gain in job-related reading, but only 40% of their end-of-course gain in general reading."10

The second corollary finding relates to the importance of background knowledge in workers' abilities to comprehend work material. Diehl and Mikulecky reported workers able to read job material 1 to 2 grade levels more difficult than they were able to read general material.11 Sticht divided workers into four groups ranging from high background knowledge to low background knowledge. Low background knowledge workers needed a tested reading ability of 11.5 grade level to comprehend 11.3 grade material. High background knowledge workers, however, were able to comprehend the material with reading ability levels as low as 6th grade level.12

These and other data lead Sticht and Mikulecky to state: "in relation to job performance, it is considerably more important to apply basic skills in specific job situations than it is to demonstrate such skills on standardized tests."13

In summary, workplace basic skills are in general of a higher level, required to be executed with greater frequency, and are more complex than those required of high school graduates with little or no adult life experience. While the generic or academic basic skills do have some relationship to workplace basic skill requirements, it is scant, and there is little transferability between academic basic skills and workplace applications. Those in the workplace who apply basic skills at a satisfactory level have developed most of their metacognitive skills after leaving school -- most likely on the job through both experience and purposeful training.

Given these clarifications, it is not surprising that U.S. business and industry are finding the general workforce deficient in workplace basic skills.

Learning Job Related Basic Skills

The fundamental objectives of generic or academic basic skills programs and those of job related programs are not the same. It is appropriate that general adult basic skills programs continue to focus on the individual learner and his or her learning goals. The primary goal is and should remain the development of the individual. In job related programs, on the other hand, the mission and goals of the organization are a primary concern and may dictate the content of learning, especially if all or most of the training costs are borne by that organization. This is not to say that the development of the individual and the goals of the organization are antithetical. Increasingly, business and industrial organizations are adopting an enlightened perspective on the long term benefits accruing from a workforce of highly developed employees. In the shorter term, however, the context for that development is often dictated by technological change, customer requirements, and competition. The organization thus becomes the primary client and the learner the secondary one. The primary goal is to have a well qualified workforce so that the mission of the organization can be carried out. At times, individual learner goals may have to be sublimated to those required to further the organization.

This fundamental shift from an individually oriented learning program to an organizationally driven one is not readily understood by many adult educators. Accepting the organization as the primary client implies a fundamental shift from an educational context (one essentially established and controlled by the teacher) to a functional job context. Even adult basic education programs dedicated to increasing the learner's

functional generic competence may not readily recognize the changes required, although in those cases, the shift is far less radical. The functional context principle confirms that skills and knowledges are best learned when they are presented in a context that is meaningful to the learner. This means the basic skills program should use job reading and computation materials and tasks to the maximum feasible extent. But accepting the organization as the primary client also means that the primary criterion for judging learning effectiveness is improved job performance. Although this presents new complexities for effective evaluation of results, it compels adult educators and trainers to more effectively simulate actual job requirements. "The more similar the basic skills training tasks are to the actual job tasks, the greater will be the likelihood that the training will pay off in improved performance of job literacy tasks."14

The complexity of using basic skills "to do" -- to make assessments, solve problems, accomplish tasks, and get specified results -- requires active learning. Sticht and Mikulecky stress the importance of "understanding the person as an information processing system that develops new capabilities over time using prior knowledge and skills as the means for acquiring new knowledge and skills." This has significant implications for instructional and curriculum design. Instruction needs to be designed around active information seeking and processing using job-related functional basic skills in tasks such as learning how to locate information in job manuals, and how to manipulate information actively to produce matrices and flowcharts.15 Each trainee should be actively engaged in learning tasks for the

greatest amount of time possible.

These requirements for job related basic skills are best addressed in competency based training programs. These programs address two main ideas. First, what is learned should be derived from the learner's occupational setting and the learning outcomes should be stated and measured in terms of acquiring the basic skill competencies needed to perform the job tasks. Secondly, the learning culminates in demonstrated mastery. In job related basic skills programs, it should be possible to set the standard of mastery at 100%, i.e. all trainees should be able to master 100% of the basic skills competency required for job performance.16 In summary, job related basic skills are best learned in programs designed on the following:

- The organization, its goals and mission, are recognized as the primary client.
- The instructional system design is competency-based mastery learning and the skills and knowledges taught and mastered relate to the work setting.
- Training is conducted with the maximum feasible use of job reading and computation materials and tasks.
- The person is understood as an information processor whose skills and knowledge increase most rapidly by being actively engaged in learning tasks.

Using Educational Technology

What is the relationship of educational technology to the requirements for learning job related basic skills?

A major recurring problem in addressing this question is the distinction between theory and practice. In theory, educational technology can effectively address all the learning issues

summarized above. Computer Assisted Instruction (CAI) and Interactive Video Disc (IVD) are particularly attractive in achieving competency-based mastery and increasing the learner's time in active engagement in learning tasks. The addition of CD-Rom synchronized voice with CAI promises to further enhance CAI effectiveness. In the job skill domain, actual experience and proficiency with computers that may first be acquired in the training program are directly transferable to workplace requirements, even if the direct content and purpose of the training is not computer literacy or computer proficiency. Workers who learn basic skills using a computer are better able to relate to computer stations on the work floor. There are no major theoretical barriers to improving job related basic skills through the assistance of educational technology.

In practice, however, there are issues of cost and hardware availability and of software appropriateness. Both these issues are resolvable as improved technology reduces hardware costs and improved software continues to be generated. Significant gains in instructional software are increasingly evident; it is therefore possible to project a fairly near term solution of three to five years for a large portion of job related basic skill requirements, assuming an increasing developmental effort in this area.

Over the short term, the major issues in implementing educational technology may have more to do with application than with costs. Advantages of scheduling and individualized pace may outweigh questions of cost effectiveness for both companies and educators. Guidance on effective utilization then becomes the issue.

In 1988, the ERIC Clearinghouse on Adult, Career, and Vocational Education issued a Practice Application Brief entitled "Computer-Assisted Instruction in Adult Literacy Education." The Brief summarizes research findings and provides guidelines. Much of it is worth reproducing here to provide clarity for future discussion of educational technology applications actually encountered.

Research Findings Related to Computer-assisted Instruction:

- CAI is effective for a significant number of adult learners. Results of numerous research studies revealed that individuals in adult literacy programs increase their test scores and/or grade-level equivalency through the use of CAI. Although not all researchers claim that their results are statistically significant, most report gains in achievement with CAI.

- CAI is effective because it provides the adult learner with flexibility, control, individualization, privacy, and immediate feedback.

- CAI effectiveness depends to a great extent upon the instructional staff. In literacy instruction, CAI should supplement rather than replace instructors or tutors. Research revels that the effectiveness of CAI depends upon instructors' commitment to it as an instructional medium as well as their expertise in using it.

- Undereducated adults generally have positive attitudes toward computers and are interested in using them in their educational programs. Researchers report that even before they have experience with computers, non- or low-literate adults tend to have favorable attitudes toward them.

- CAI effectiveness is limited by the shortage of appropriate software.

- CAI has not been effective with all learners. Although CAI is effective with a significant number of adult learners, it should not be viewed as a panacea. There are some adults who have reported that they do not like working with computers.

The following guidelines for effective use of CAI in adult

literacy programs are derived from the research findings as well as practices cited in the literature.

1. Familiarize all instructional staff, whether paid or volunteer, with the CAI aspects of the literacy program. Individuals who have been responsible for tutor-based instruction cannot help their students make the transition to CAI unless they are knowledgeable about it.

2. Provide sufficient demonstration time and enough individual personal assistance for students to feel comfortable using computers.

3. Provide training and inservice opportunities for instructional staff. Since instructor commitment and expertise are key components in the success of CAI, staff need initial training as well as continual updating.

4. Use only software that is appropriate for adult learners. Adults will be "turned off" unless the content of the software is suitable for them.

5. Do not think of the computer only as a tool for individual use. Peer tutoring, group assignments, and group problem solving can also be a part of CAI.

6. Provide for flexible scheduling of microcomputer use.

7. Do not depend on the computer to be the sole source of instructional support. Most adults engaged in literacy education need the support, assistance, and reassurance that only a human can provide. The research reveals that computers are most effective when used appropriately by skilled teachers.

8. Provide opportunities for students to develop occupational skills through CAI. For example, students can learn and use word processing as a part of developing writing skills.17

Although in this Brief only CAI is addressed and the field of application is adult literacy education in general, the findings and guidelines are highly applicable to other educational technology and to learning job related basic skills.

II

PERSPECTIVES ON JOB RELATED BASIC SKILLS PROGRAMS

The analysis presented in the previous section can provide training design criteria for assessing successful job related basic skills programs. A job related basic skills program is first and foremost a learning program for workers employed in a specific setting. If it is to be most successful, it will incorporate all those criteria identified.

However, a program may meet the identified criteria and not be as successful as it should be because of factors external to the training program itself. For example, it may aspire to incorporate all the design elements but fail to acheive its goal because of lack of resources. Or, a well designed and executed training program may be thwarted by logistical barriers such as transportation and scheduling or by political realities between management and union. Conversely, training programs that fall short in incorporating all the desireable elements may experience more success than expected because of positive external factors. For example, company commitment to and support for education and learning may motivate workers to achieve greater gains than would otherwise be the case. Thus, in assessing factors contributing to the success or failure of job realted basic skills programs, those relating to sound educational design must be considered in conjunction with factors extraneous to the learning setting itself.

A series of field investigations was conducted for the

purpose of viewing current job related basic skills programs in a variety of settings and from a diversity of perspectives. These are summarized in this section as "perspectives" and provide the data for analyzing issues and developing conclusions.

PLUMLEY COMPANIES: A PRIVATE COMPANY PERSPECTIVE1

Paris, Tennessee

Plumley Companies (PC) is a privately held company, not unionized, employing close to 1000 people in the manufacture of hoses, seals and other elastomer parts. About 650 people work in the Paris plants, the rest in four other locations in Tennessee and Mississippi. Customers include Ford, GM, Chrysler, and Nissan's Smyrna, Tennessee plant. All have recently given PC quality awards: Q1 from Ford (1986), QE from Chrysler (1987), SPEAR 1 from GM (1987), and Quality Master from Nissan (1988).

These recent quality awards portray a dramatic turnaround for PC from a 1981-1982 crisis when high reject rates put Plumley in danger. At that time, U.S. auto companies were starting to offer extended warranties and were pressuring their suppliers to improve quality. Plumley's old reject rate of 1.5 percent was not acceptable in this new era. Buick, its first and oldest customer, dropped Plumley as a supplier. Ford delivered an ultimatum to improve quality or suffer a similar fate.

Plumley succeeded. Now, only 1 out of 10,000 parts it ships does not meet quality requirements. In 1987, it gained a new customer in Nissan, and in 1988, Buick again began to buy from PC. As with most companies that have turned around, success was the result of several factors: PC adopted a new management strategy focused on quality, made major capital investments in new technology, and adopted a new emphasis on human resource development

Human Resource Development and PC's Quality Turnaround

PC's current top management consists of the four sons of its original founder, Harold Plumley, who functions in a "semi-retired" status and serves as a member of the board of dirctors. The board is chaired by Mike Plumley who also serves as Chief Executive Officer. PC's top management openly describe their management philosophy as paternalistic, although in the PC vocabulary that term carries no connotation of exploitation. That paternalism includes a commitment by management to give employees a stake in improving productivity by gain sharing. Plumley management believes this should be done even if all the improvement could be attributed to new technology. PC returns half the savings from reduced waste and reject rate back to its employees. Last year employees got nearly $700,000 from the incentive program. In the most recent quarter, employees received an average of $316, which translates into more than $.60 per hour worked.

Plumley's initial strategy for bringing up quality was to bring new technology on board and to retrain operators to use statistical process control(SPC) techniques. CNC presses from France were bought at a cost of $180,000 each with total "platform" costs reaching about $250,000. Training workers thus had two objectives: to protect the new capital investment from misuse and possible damage, and to qualify employees to effectively carry out new SPC duties. It was initially projected that a training period of about six months would meet the new

requirements.

Plumely sent some workers to a vocational-technical school for SPC training, only to find out that many were unable to do fractions and that some could not read. During the first half of its twenty year history, Plumely operated in a tight labor market and did not pay at the top of the area wage scale. These factors, together with the nature of the tasks required at that time, led them to hire people without regard to educational background or basic skills competence. In initiating SPC training, Plumely discovered that half of those sent to classes did not have a high school degree. It also discovered that many supervisors couldn't do basic arithmetic.

Of its workforce at that time, 218 Plumely employees were not high school graduates. After not getting the results it wanted from the local educational institution, Plumley set up its own learning center and hired an education director.

During the period of turnaround at Plumely, labor market conditions changed significantly because of the exodus of several higher paying industries. This presented the alternative of replacing now unqualified employees with persons with higher educational background and skills. Plumely elected to maintain its paternalistic relationship with the current workforce and to provide workers with educational opportunities rather than to dismiss them. This no lay-off policy was no doubt reinforced by the desire not to significantly raise its wages and by its assessment that those unemployed were not that much better qualified on the whole than their experienced workers. Over the

years, Plumely has kept wages low but does provide a strong benefits package to its emoloyees. Although the current area unemployment rate is eight to nine percent, PC essentially views the local labor pool as largely unemployable in relation to the new technological requirements of its industry.

PC's management used a number of strategies to get the message across to workers that the company was at great risk and that new ways of doing business had to be implemented. At the heart of the message was a ten point management plan emphasizing high quality at low cost. The first point places "highest priority" on being the "best, in the whole world, at what we do," with each employee a team member "totally committed to quality performance and excellence." Point 5 states: "We must recognize the need for change in our own lives and improve our **Education. The level of performance of every employee must be upgraded just To Preserve Opportunities** to serve our customers."

Plumely's ten point management plan is amplified in a company book entitled "The Quest for Perfection." Each point of the plan is elaborated primarily by unascribed quotations from Plumely employees. The chapter on education contains 32 quotations, of which the following are representative:

> Education is where quality work begins. It is the most important factor in establishing employee confidence. Having confidence in what you do will improve the quality of your work. Education: our future depends on it.

> It doesn't mean you have to have a college degree...It simply means understanding and learning to read charts and bar graphs...things that are important in making a qualilty part.

> Education is not a matter of grades completed or books read.

PC uses many approaches common to participative management strategies, but management prefers to refer to its system as a "participative relationship." This refers to open channels of communication, a respect for employees' knowledge, and controlled involvement through which management reserves and exercises all its prerogatives. Believing that those who actually do the job know it best, PC makes extensive use of suggestions from employees. (Discovering that half of PC's workforce lacked the skill to write up its suggestions was another milestone in its commitment to employee education.) However, at least with the current workforce, PC stops short of full participative management. One corporate official explained: "The operator is always the best source for learning what's wrong. He's only the best for identifying the solution if he's educated."

PC has learned to listen to its employees and to the employees of its customers, as well. Plant visits are conducted by management with teams of PC employees. The same philosophy of participative relationship drives these visits. Customer employees using PC products are asked how the product could be improved. Ideas are taken seriously and acted upon. A Ford employee suggested a rigid gasket could be more efficiently and effectively installed than the current flexible one. Plumely has now developed the rigid gasket at a cost savings. The new gasket can also be installed by robot if Ford chooses to do so.

Plumley's Education Program

PC's management initially thought their education program for workers would be short lived, lasting only as long as needed to learn to operate the new technology and implement SPC. It now views its education program as a continuing part of its corporate activities. In part, the initial view was based on an assumption that PC employees had higher levels of basic skills than was the case. However, Plumely's commitment to education has moved beyond an initial problem, remedial orientation to a strategic commitment to full development of human resources. One evidence of this is the policy that when workers are supplanated by technology, they are viewed as being freed to perform other less routine tasks. The commitment to education and training in further developing workers is taken for granted.

Like other companies, PC has never fully accounted for its overall expenditures for training. One corporate official estimates that between July 1, 1988 and July 1, 1989 Plumely spent $250,000 on all education activities. These include some efforts with the local school system to improve K-12 education, some scholarship support, and a small fraction of training on company time at $8 per hour. With total sales of $75,000,000, training and education expenditures represent about 3/10 of one percent of revenues. In management's perspective, these costs were covered out of the $700,000 savings the company retained from reducing the reject rate and waste. However, because about ninety percent of Plumely's education program is on employees own time between shifts, a full value estimate of the cost for all Plumely employees would be significantly higher.

For a medium size company, Plumley's education program is extensive. It consists of:

- o an orientation program. This includes a two hour orientation about Plumley (including a tour of those facilities where the new employee is not assigned), and ten hours of SPC training.
- o a variety of job-related training courses. Plumely'education catalog lists 30 courses ranging from two hours to thirty hours in length (plus one seventy hour course for engineers and management technicians). Some courses are required, but most are voluntary. Compensation is not offered unless the class is scheduled by a supervisor. Employees must pay for tuition and books which is reimbursed upon acheiving a grade of "C" or better. Classes at the learning center are usually taught by Plumely personnel and are offered between shifts on a first come, first served basis.
- o incentives to employees for continuing education. Plumley employees who pass the Certified Quality Engineer examination receive a pay increase of $100 a month which remains in effect for the remainder of their employment. A one time cash bonus of $600 is awarded to employees who pass the Certified Quality Technician examination, and a one time $500 bonus to employees who pass the Certified Professional Secretary examination. Plumley pays for instructional costs and the cost of up to three examinations for these programs. Tuition reimbursement is open to any employee for courses which are "now or could be job related in the future."

- a GED program. During the first year, 28 employees received their GED equivalency diplomas, out of an original group of 218 employees lacking a high school diploma. Plumley employs two certified teachers, provides books and supplies and will pay for the cost of taking the GED test up to three times. In the last six months, Plumley began to receive some assistance for the GED program, the only financial assistance it receives for its education program. The Plumley education catalog contains the following policy statement:

  GENERAL EDUCATION DEVELOPMENT PROGRAM

  Plumley Companies is aware that human potential is a vast resource of energy and knowledge that lies mostly dormant. We believe it is imperative that this valuable resource of knowledge and ability become a part of our business if we are to be competitive in a world market. The General Educational Development (G.E.D.) program is a way to bring new ideas and abilities into productivity. We began teaching these courses in the Plumley Learning Center in June, 1988, and will continue until all interested employees not having a high school diploma have had an opportunity to get one.

Initial enrollment of Plumley employees in the second year GED cycle attracted approximately twenty additional persons. PC management are concerned that those enrolling are among the most educationally ambitious and that the remaining 170 may not come

forth. There is also a growing awareness that a number of those require adult basic education instruction whereas the current GED program is designed for people already reading and computing at about the 8th grade level. To address this need, Plumley contributed $20,000 of the $50,000 cost of installing IBM's PAL program at the local vocational-technical school. Seven Plumley day shift employees enrolled in the first PALS session offered evenings at the vo-tech school. In addition, Plumley management officials are involved in area plans to survey Paris area business and industry to identify basic education need. The expectation is that industry and education officials will develop an area plan and provide new basic skills programs for employed workers.

The present GED program is a traditional educational preparation course designed to ready participants to take and pass the GED examination. The program uses the Steck-Vaughn series designed especially for adults, one of the series that is widely used for furthering general or academic basic skills. The instructors make no effort to incorporate job materials or tasks into the learning process. It is the same approach that would be used for adults out of the workforce who aspire to obtain their high school equivalency.

Given the education background of Plumley employees, offering generic academic skills improvement at the adult secondary level is a positive move. Beginning efforts to extend the offering to the generic adult basic level is equally positive. However, given the problems of retention and transferability between

academic basic skills and workplace basic skills, current and planned programs are far from the ideal. If all Plumley employees achieve high school academic competencies, they will certainly be better able to take advantage of other Plumley job related courses. They will not, however, be following the learning course of greatest return and Plumley's competitive advantage may not be as great as is assumed. Both Paris area educators and Plumley officials are victims of the assumption that the relationship between general academic basic skills and workplace skills is a strong and direct one. Unfortunately, that is not the case.

State Support for Workplace Basic Skills

With a 47 percent high school drop out rate, Tennessee is highly vulnerable to generating a workforce without even entrance level workplace competence. The state currently receives a little over $3 million in federal adult education funds. To this, the state adds a mere $389,000 of program funds, placing Tennessee 49th among state support for adult education. Other federal funds under JTPA and the Appalachian Regional Commission bring Tennessee's total adult education resources to about $6 million.

Although in recent years Tennessee has been very successful in attracting industry -- especially foreign owned -- no link exists between its adult education program and its economic development initiative. Federal funds under the Adult Education Act are directed to the least educated, many of whom are unemployed and on welfare. With no significant state funds

directed to the program, it is very difficult for the SEA to offer assistance to any workplace basic skills programs. The historical application of adult education funds -- while proper and appropriate -- have given adult educators and practictioners in the state very little experience in providing workplace contextualized programs. Plumley's traditional GED prep course is a case in point.

The current State Director of Adult Education in Tennessee has been in this position about two years. A former adult education practictioner with seventeen years experience as a professor of adult education at the University of Tennessee, his knowledge of appropriate adult education methods and practices is extremely high, including understanding the importance of offering competency based programs in the context most meaningful to the learner. However, without state funds to support workplace basic skills programs, he has little opportunity to develop a new program thrust that acknowledges the difference between generic academic basic skills and job related basic skills. Correspondingly, companies in Tennessee have little alternative to paying for their own basic skills programs and accepting the best of traditional approaches never designed to meet workplace needs.

The Plumley Perspective

Harold Plumley, a prominent member of the Tennessee Association of Business, believes that business is just now recognizing the scope of its education problem. While PC has sought little government support for its education activities, Plumely feels

that some incentives are needed to enlist other companies into remedying basic skills problems. He proposed to the Governor that the state provide employers with a $1000 tax credit for every employee that is successfully remediated through business efforts, but this was rejected as too expensive. He still thinks the idea has merit.

PC's President, Rich Plumley, expressed frustration at the prospect that PC might still be in the basic education business in the year 2000. He said he wouldn't mind spending $250,000 per year on basic skills training if his competitors had to, for then they had no competitive advantage. But his competitors are Japanese, and they don't have to spend money on basic education. One Japanese rubber parts supplier he visited had no formal training program whatsoever. Plumley had assumed this Japanese firm would have an extensive training program because machine operators had responsibilities, such as scheduling production changeovers, that only specialized personnel did at Plumley. He attributed this to strong basic skills, and would like to see Plumley's workforce continue to grow to an equivalent level of responsibility and capability.

As a privately owned company, PC can and did make the decision to invest in technology and change its orientation to employee development. Plumley is an example of a company seeking to upgrade the skills of a very poorly educated workforce to the level needed to use advanced technology effectively. In about six years, PC has reached the point where it now believes it can compete on quality and price on a worldwide basis. Having made

its first shipments to Japan in 1987, it now ships products to 16 countries. PC's management believes it would not be meaningful, and perhaps impossible, to determine how much of PC's comeback is attributable to advanced technology and how much to improvements in the skill level of employees. But management has no doubt that technology alone could not have accomplished the turnaround. Plumley's President stated that, forced to chose between an untrained workforce and advanced technology or a well trained workforce and old technology, he would choose the latter. He would not have said this five years ago.

The Aetna Institute: A Corporate Perspective

The Aetna Institute for Corporate Education, located at Aetna's corporate headquarters in Hartford, Connecticut, offers over 150 courses and programs for employees in executive, management, and supervisory education; general skills development; and information systems education. Each year, some 20,000 employees -- almost half of Aetna's total workforce -- participate in these programs through traditional classroom instruction, self-paced learning, or in direct broadcast telecourses.

Aetna Institute's current basic skills program stems from a program instituted in 1987. Responding to job upscaling triggered largely by computerized office systems -- principally electronic mail, word processing, and spreadsheets -- coupled with the recognition that demographic forecasts projected an increasing problem for clerical employees, the Institute launched an Effective Business Skills program. Based on a needs analysis, the program addresses 5 areas: 1.) writing, 2.) verbal, 3.) math, 4.) computer literacy, and 5.) learning to learn. In 1988, about 500 employees completed the program; in 1989 another 800 took the course.

The Institute covers its training costs through a charge-back system to the unit from which a trainee is sent. (Release time is an additional cost not included in the charge-back formula). While an employee may request training, the final decision is that of the supervisor. The cost factor together with the

disruption to production caused by "losing" a worker, means employees receive training primarily to meet their immediate job requirements. To mitigate the disruption of production, the Institute organizes training in small blocks of time, typically two hours. Nevertheless, developing people for future job requirements is rare except in technical areas.

The Effective Business Skills course is not only job specific, but, as much as possible, Aetna specific. For example, a course for security guards was built around specific requirements for completing "incident reports" after supervisory personnel identified this area as a problem. The incident report was used as the training context for what, in a more generic program, would have been for some of the guards, English as a second language training. In contrast, the Institute also offers a general skills program that uses generic Aetna examples for improving writing, presentation, and listening skills. However, this two day course assumes students already possess functioning basic skills.

All training at Aetna is voluntary. Institute personnel observed that many of those for whom the Effective Business Skills course was designed were not coming forward. Experience with that course indicated that some of those attending lacked the basic reading and math skills to use word processing or handle basic formulas in spreadsheets. They inferred that those most in need of basic skills education would be the least likely to reveal this to their supervisors and peers by volunteering for a basic skills program. This led to establishing an evening,

non-release program requiring neither supervisory approval nor peer knowledge. To safeguard anonymity, evening course registration is handled on a secured personal computer separate from all others processed on a mainframe. To offset the training costs, a blanket charge-back to each unit was negotiated based on the number participating from the unit with all names withheld.

Although initiated for those needing basic skills education, the evening program is now more popular than the day time release one, partially because a wider range of programs are now offered in the evening in response to employee requests. Free from specific job application and accountability requirements, the evening basic skills program assumes that participants are either learning these skills for the first time or are in need of a much more deliberate pace than the Effective Business Skills course offers. In addition to attracting many who clearly lack the reading and math skills to handle current software used on the job, the evening basic skills course has also attracted professional and technical people eligible for the day release time program. These latter cite the slower, more relaxed pace as the reason for preferring the evening courses.

Although the evening basic skills program is comparatively new, voluntary basic skills opportunities are not. The Institute has a 10 year relationship with Literacy Volunteers of America (LVA) who have provided a tutorial supplement for those who wanted to remain anonymous. Over this period, the Institute also created a math and writing program using Aetna employees who volunteered to serve as tutors. Using LVA's training program,

the Institute provided supplementary training for tutors and now uses them to staff the evening basic skills program, for which they are paid.

A similar relationship has existed with the local adult education program through which Aetna offers a GED preparation course. Aetna reimburses the local program for the costs of instruction. Thus, basic skills opportunities at Aetna are not new except in the context of a formalized evening program supplementing a job and Aetna specific skills program. No effort has been made to bridge the basic skills course with the job or Aetna context or to emphasize in the curriculum basic skills applied to the adult's work or life context.

The Institute is developing a data base from which it hopes to identify significant variables among those preferring the evening program. Although programs such as Effective Business Skills offered in the evening are the same in content and pace as day offerings, other programs such as basic skills provide a freer climate for experimenting with different learning approaches.

Institute personnel are especially pleased with their "Skills for Learning" component of the Effective Business Skills program. A two day course, the first day focuses on skills for analyzing employees' current and future job skill requirements and their own skills. Going on to principles of adult learning -- how adults learn, learning styles and options, and individual problems in earlier learning efforts -- the day ends with setting individual career and life goals.

Returning to the workplace, individuals assess their opportunities on the job and some time later return for day two. That day assists each one in developing a self-paced, six month learning plan directed to improved job opportunity. The plan is reworked with the goal of having each person proficient in developing subsequent learning plans unassisted

South Carolina: A Gubernatorial Perspective

The Governor's Initiative for Work Force Excellence

In 1988, South Carolina's Governor Carroll A. Campbell, Jr. created an Initiative for Work Force Excellence. Based on "the realization that the workforce is the key factor in continued productivity and competitiveness" in global and national markets, the Initiative is designed to assist employers throughout the state to offer high quality basic skill programs to their employees. To achieve this purpose, an extensive new state network was created to effect a partnership among state government, business and industry, and basic education providers.

Utilizing the state's 16 local technical two-year colleges, a new work force specialist position was created in each institution. Viewed as the managers of the Initiative, work force specialists serve as basic skills consultants to employers. They also interface with 43 local business round tables made up of over 300 business leaders appointed by the governor. In turn, the chairpersons of each round table form the state round table that advises the governor. The structure is designed to coordinate the services of educators with the needs of employers and the community and is viewed as incorporating a series of checks and balances that ensure that the basic skills programs meet the specific needs of employers throughout the state. This structure is illustrated in Figure 1.

The Initiative's "definition of 'basic skills' encompasses subjects from learning to read through technical math, algebra,

South Carolina
Initiative for Work Force Excellence

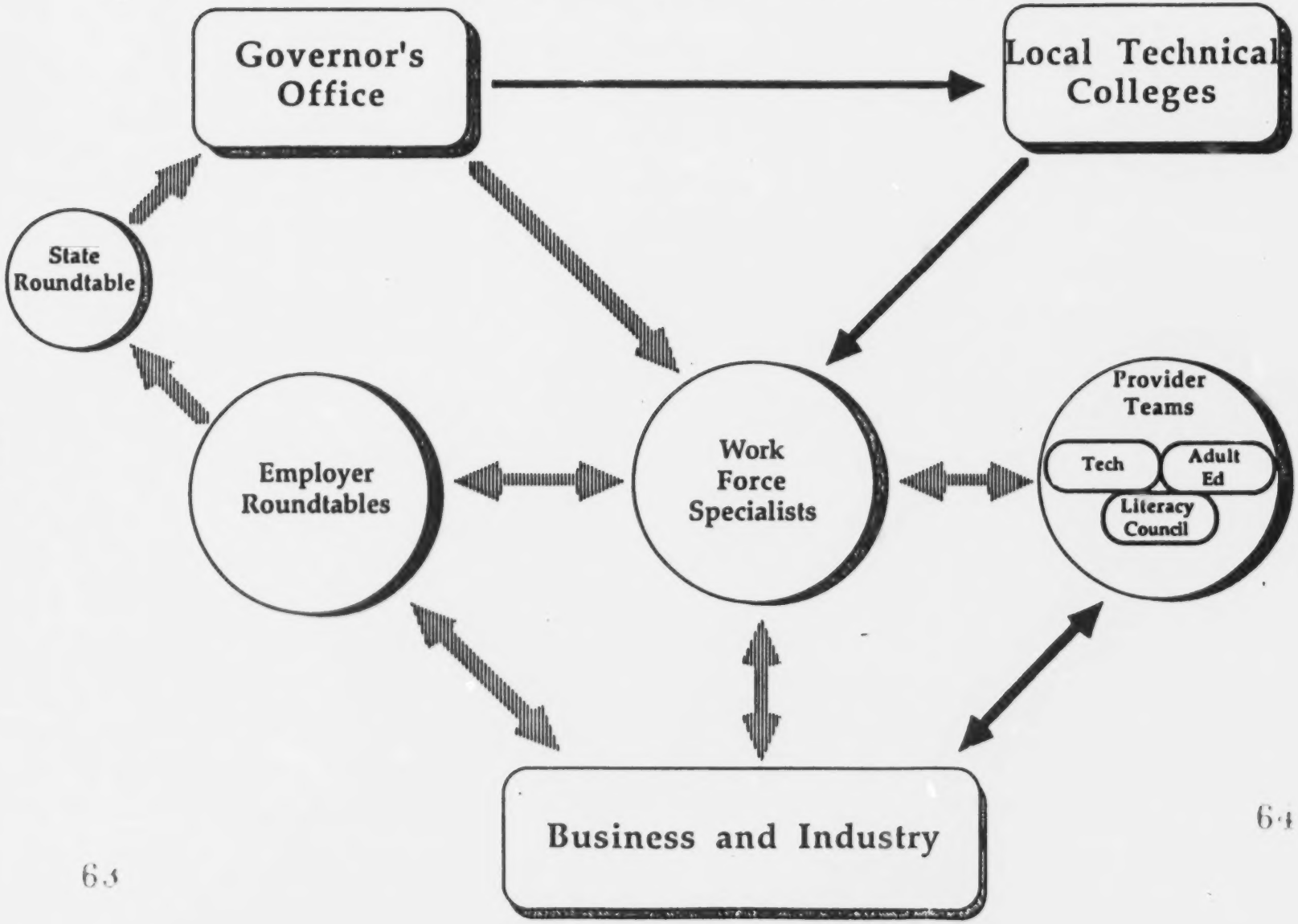


Figure 1

and basic computer skills. The philosophy of the program is that 'basic skills' are those skills employers require which are prerequisite for the skills needed to perform a job or to upgrade to a higher job."

Chosen because of their experience in developing workplace training programs, work force specialists consult with employers from initial contact to final program evaluation. Steps in the process include setting goals and objectives for employee participation, orienting management and employees, assessing, orienting instructional teams, planning and operating classes, monitoring, and evaluation. The work force specialist monitors all steps of the process and is an active participant in ongoing evaluations.

South Carolina's adult education program under the Adult Education Act has always been delivered through local school districts rather than through local technical colleges. That program also has a long tradition of interfacing with Laubach Literacy volunteers, the longest of any state administered program. More recently, volunteers supported by Literacy Volunteers of America have also been utilized. Historically, the program has made extensive use of one-on-one tutoring in conjunction with programs designed to assist individuals in achieving a high school equivalency through the GED Test. There is no history of developing programs to serve the needs of employers nor of programs specifically designed to prepare individuals for employment.

The Initiative recognizes both philosophically and

organizationally that workplace basic skills are different from those traditionally imparted through the state adult education delivery system. The following statement from a work force initiative brochure illustrates that those administering the program understand the implications of recent research on workplace basic skills:

> Employees who are trained with reading and math materials designed specifically to reflect their job requirements improve their basic skills faster and retain their knowledge longer than students enrolled in traditional education classes.

South Carolina's local technical colleges have a history and tradition of service to employers while those in the traditional adult education program are oriented to serving individual learners within the context and format of high school equivalency. Perhaps the highest skill requirement of the work force specialist is that of assisting providers of traditional adult education services in understanding and being responsive to the needs of employers and to the basic skill needs of employees. At the state level, the fact that the Chief State School Officer is an elected position held by a member of the Governor's opposition party does not make for an easy interface between the Initiative and the traditional adult education program administrators. At the local level, when educators, business and industry officials, and community leaders are able to agree on common goals and have a shared view of learners' needs, political differences do not seem to matter.

Workplace Literacy Programs

By June 1989, the Governor's Initiative had estimated that

30,688 people needed to be trained throughout the state's sixteen regions. These estimates came through the work force specialists and interactions with employer roundtables and employers, but, at that time, were not taken as an estimate of total state need. As employer awareness and interaction with work force specialists increases, additional needs are expected to be identified. Also in June 1989, almost 3,600 people were in training and another 1,288 had been trained.

The Program Manual issued by the Governor's Initiative for Work Force Excellence "describes the steps necessary for the development of workplace skills enhancement programs." Designed to guide both employers and those who provide instructional services, an overriding objective is to offer employers a range of options for providing their employees basic skill training with work force specialists serving as consultants to employers.

The manual recommends using the TABE (Test of Adult Basic Education) locator for initially identifying employee skill levels and goes on to point out that the TABE locator does not provide enough data for designing individual learning plans. Assessments "based on mastery of skills as opposed to grade level achievements" are recommended, but no valid and reliable assessment instruments are identified. While this avoids the problem of using standardized tests that measure skills different from those being taught, it does little to verify that what is taught is actually mastered. This is especially true for part time and volunteer adult education instructors with no training in assessment techniques and methodologies. The manual does

prescribe that a "professional" administer the assessment, but does not specify that that professional have expertise in assessments and measurements. Given the relatively esoteric character of that expertise and the scarcity of such trained specialists, to do so would be unrealistic. It is not surprising then, that in many of those programs described or visited, standardized tests such as other versions of the TABE are being used.

The manual advocates a number of practices based on what is known about the specific requirements of workplace literacy and of proven practices in sustaining interest and learner motivation:

- o daily reinforcement of each student's goals;
- o a system of recognition with incentives from both the employer and the Governor's office;
- o job specific curriculum and materials, including job vocabulary and applying new skills to workplace situations;
- o employability enhancement and functional application skills including critical thinking, problem-solving, job enhancement, oral communications, technical writing, self-esteem, teamwork and leadership;
- o plant tours by an instructor before beginning classes and a close working relationship with the work force specialist.

Programs delivered through Williamsburg Technical College in the eastern part of the state provide a mosaic of the effect of the Initiative in a rural area. Applying the program manual guidelines, the work force specialist promoted the compilation of

a skill list among 300 employees in a poultry plant. Advising the instructor that "there is no textbook out there, so don't bring one in," students were asked to bring in work samples and problems from their jobs. Despite this highly participatory approach, only 8 employees responded for instruction, primarily because of a lack of support by plant management. The situation improved when new management came in and showed support. A voluntary program on workers' own time offering 3 hours a week instruction over a 12 week period recorded 2 to 4 grade levels of improvement in math, the only subject offered to date. The TABE test was used for assessing gains.

In high contrast to the poultry plant is a program at International Bio-Synthetics (IBIS). A Dutch owned company with corporate headquarters in The Netherlands, IBIS has manufacturing facilities in Holland, UK, USA, France, and Belgium and direct access to the research resources of the Royal Dutch/Shell Group and Gist-brocades. The Kingstree, South Carolina plant is primarily involved in producing enzymes used in the manufacture of detergents. The vice president for manufacturing and technology at IBIS Kingstree serves on the local Round Table advisory committee for the Governor's Initiative and was a principal force in promoting a 22 week technical training program -- offered on a voluntary basis on employees' own time. Forty-three employees, or 96% of those eligible, completed the program.

IBIS has a long standing commitment to participatory management, worker-centered job design, and knowledgeable

employees. The director of manufacturing attributes the program to a shared concept that it is "the responsibility of management to keep operators and resource people abreast of our fast-changing technology." However, IBIS management credits the Governor's Initiative for triggering its technical training program.

An IBIS professional coordinated the preparation of the course and served as primary instructor and facilitator. Program evaluation feedback attributes him as a primary factor in the program's success. The vice president for manufacturing and technology suggested a "teaching/learning experience" to encourage teams of participants to work together in order to solve complex class assignments. Each week the group prepared responses to over 100 questions with each person emerging as an expert in certain areas and making significant contributions to the learning process.

The curriculum was not in any traditional sense a basic skills program. Modules included "basic" physics and chemistry, flow measurements, filtration, principles of fermentation, fermentation troubleshooting, and plant mathematics. However, in each area, very little prior knowledge was assumed, or, if assumed, was viewed as needing review. For example, plant mathematics began with whole numbers, fractions, decimals, and percents, and went through "some algebra and in particular the use of exponential functions." The curriculum is itself evidence that there is no basic skills problems at IBIS, apparently as a result of earlier selective hiring procedures and the company's

long standing commitment to maintaining knowledgeable workers.

In April 1989, the company sponsored graduation exercises that included a social hour, dinner, presentations of framed diplomas from the Governor's office and Continuing Education Unit (CEUs) certificates from Williamsburg Technical College. The Governor's senior executive for economic development was the keynote speaker.

Baxter Healthcare Company in Kingstree, South Carolina, employs about 550 people manufacturing surgical gloves. The plant is experiencing continual changes in technology and is committed to improving efficiency by organizing work around cross-trained teams. Working with the production manager and the warehouse materials manager, the work force specialist obtained agreement to a 12 person pilot program among the warehouse group. Using the TABE locator, 71 were tested with the group as a whole scoring higher than expected. However, management described them as having coping behaviors but lacking the ability to learn new tasks.

The work force specialist first surveyed management's perception of need. To be prepared for the Baxter workplace of the future, they saw employees having to develop and build these skills:

- ability to work with less supervision
- ability and initiative to problem solve independently
- adaptability to complete new forms and charts accurately
- ability to adapt to change
- attention to neatness and legibility

The specialist pledged to incorporate management's perception of employee needs throughout the program along with numerous forms, job instruction breakdowns, and other documents.

Working with the work force specialist, the supervisor developed a task list and assisted in a skills analysis for warehouse employees. The work force specialist "shadowed" some employees to verify job skill requirements and gathered work force terms and materials to integrate into the curriculum. Throughout the course, students were asked to bring in forms and problems related to work.

Employees were asked to volunteer for the pilot group, 17 of whom did from which 12 were selected. Using the 1972 version of TABE, those in the pilot group ranged from the 2nd to the 7th grade levels in reading and math.

A 13 week, 3 hours per week release time program was conducted in workplace reading and math. The group was given a choice and elected to stay on regular class schedule rather than learn through individualized learning programs. The instructor, provided by the local adult education program, adapted to the plant setting and workplace curriculum without difficulty. During the 39 hours of instruction, on average, employees gained one and a half levels in reading and math. Actual scores of the 12 pilot members, by percent, were as follows.

	Reading		Math	
Grade lvl	Pre-test	Post-test	Pre-test	Post-test
2 - 3	45%	9%	18%	0
4 - 5	25	28	46	27

6 - 7	25	63	36	73
8				18

Managers expressed a commitment to upgrading employees, "not to get them a GED, but to perform their jobs," underscored by the attitude that "it is something we can't afford not to do." They exhibited enthusiasm for the program against the background of emerging quality improvement teams, teamwork, and new Statistical Process Control requirements to read charts, understand standard deviations, upper and lower limits, and use calculators. Baxter Healthcare plans to continue the program and extend it to other departments.

Milliken Company is a major textile producer with 68 manufacturing locations and headquarters in Spartanburg, South Carolina. Its Kingstree plant with 180 employees is offering a "Skills Enhancement Program" with the goal of having every employee reach a basic skills level of 8th grade or above. With the installation of 400 new weaving machines, the plant is restructuring from 38 job titles to 4 with the requirement that an employee must know 3 jobs to receive a promotion and higher pay. A basic skills/GED program is available to employees on their own time on a voluntary basis. Although the textile industry is increasingly impacted by technological change, management at Kingstree does not see an educated work force as vital to its future and profitability. The basic skills program is made available as an opportunity for employees to better themselves under the Governor's Initiative.

Trident Technical College located in Charleston has been

promoting the initiative among companies in both an urban and rural setting. Although the applications are distinctly different, the work force specialist at Trident Tech finds her problems to be similar to her colleagues in other regions of the state. She finds her own experience clarified by the insights of the specialist in Spartanburg who reports that too often employers want to offer basic skills out of a sense of "moral obligation" rather than a realization of company need. As with Milliken in Kingstree, making basic skills programs available on a voluntary basis is for many employers an act of paternalism rather than enlightened self-interest.

Mobray Company, a West German owned company under Bayer, employs about 300 people in manufacturing textile dyes in Berkeley county, a county adjoining Charleston. Like IBIS, the program is sponsored and conducted by the company, but unlike IBIS it is a basic skills program and is provided on 4 hours per week release time. Participating employees are even paid overtime if they can't finish their work because of time devoted to class. "Isn't it interesting," commented the work force specialist, "the foreign owned companies are the ones who point out to us real fast that our work force doesn't cut it." Out of 90 employees tested, 30 were found to be below 5th grade in reading and math. Mobray hired a full time instructor from Trident Tech, reimbursing the College for the salary. The instructor does one-on-one testing, teaches reading, coordinates use of others in math instruction, and assigns and monitors services. Mobray promoted the use of volunteers among spouses of

employees, using them to teach those below 5th grade level employing Laubach methods and materials.
The company's objective is to qualify employees to handle statistical process control and a new generation of job manuals accompanying new equipment and processes.

Despite these impressive resources, the work force specialist's enthusiasm is reserved. The company is pleased with the program but she sees mistakes they have made. She summarizes it as "costly but effective from their point of view." She was unsuccessful in getting them to develop job related materials and even in using "Laubach style life experiences" to increase students' ability to transfer classroom learning to the job. Analyzing the job manuals, she found much of it written above the 12th grade level but could generate no interest in simplifying the material. "The company is the customer," she asserts, and hopes for improved program practices over time.

A program for Charleston Public Works presents an opposite scenario -- good program and practices hampered by irregular attendance because of no release time. Reading and math materials have been rewritten to fit the public works context and "whole life experiences" will be incorporated to increase transfer of what is learned. Again, the company is the customer.

Trident Tech's program is closely allied with the Laubach and LVA volunteer effort. Dating from 1971 in the Charleston area, Laubach materials and methods have been used in conjunction with the Charleston School District Adult Basic Education program. The recent relationship between Trident Tech and Laubach -- and

even more lately, LVA volunteers -- is principally attributable to the skills and adaptability of the paid volunteer coordinator. Bringing years of experience in the Charleston educational system and an unusual ability to adapt to the learner's setting, she brings crucial insight and expertise to the role. "Nothing in my job description said I had to be a trainer, but I felt I needed to be." Coordinating 219 tutors -- about 30 of whom are in workplace programs -- throughout the Charleston School District, she is paid for 30 hours a week but regularly puts in 52 hours a week. Volunteers in workplace programs are trained to make the one-on-one tutoring relevant to the life and context of the employee, thus providing continuity of instruction and materials when students advance into classroom groups.

As a major eastern naval facility, Charleston's naval base and shipyard are a major source of civilian employment. Civilian employees involved in painting, cleaning, and welding ships have recently been required to pass a written test designed to assure they can understand and comply with a wide range of safety requirements. Formerly given orally, the test is administered randomly every two years, although an individual may be required to take the test more than once during a single biannual test period. Anyone who fails the test four times is disqualified for employment.

Horror stories about the test abound. The work force specialist estimates that it is written at a level far higher than necessary to understand actual safe practices and procedures -- "probably at the 12th to 15th reading level." Consisting of

multiple choice and completion questions, it is alleged to have been authored by an instructor with no tests and measurements training or expertise. Employees who are enrolled in basic skills programs -- even if they have tested as non-readers -- are not exempt from taking the test if selected randomly; thus, no support is provided for those who cannot meet the new literacy requirement imposed by the test, nor is there a program designed to aid otherwise qualified workers in meeting the new literacy requirements within a reasonable period.

Basic skills classes using Laubach and LVA materials and methods are offered on a voluntary basis at the shipyard. Those attending are mostly non-readers or reading at very low levels. No release time is provided, but resident instructors said that an hour release time for an hour of personal time program would be instituted early in 1990.

Basic skills courses are also offered on the naval base and on board ship for navy personnel. Using the Fry readability method, the volunteer coordinator scored navy manuals at the 14th grade reading level. However, the greatest motivator for improving basic skills by navy personnel is the requirement to pass written tests to qualify for promotion. One Seaman 2/C was described as "reading at the 6th grade level but spelling at the 1st grade level." In September 1989, he took a Seaman 3/C test for the tenth time, having taken it every six months for 5 years. He came to the basic skills program a few months earlier when it became available.

The Governor's Initiative is a carefully conceived strategy

of participatory involvement among business and industry, education, and community leaders, with the work force specialist playing the pivotal role of catalyst and facilitator. The program guidelines are soundly conceived on the basis of research based knowledge and practice. The requirement of work related curriculum and materials is crucial; it is also time consuming and an area in which all instructors are not well versed. Recognizing this, the Initiative is adding new budgetary support for curriculum development in every project.

Connecticut: A State Education Department Perspective

The link between the adult education program and workplace readiness has historically been stronger in Connecticut than in most states. A leader in state matching dollars allocated to adult education (currently over $6 million in state funds to $1.3 million federal), the state education agency (SEA) has long seen its role as a broker between local education agencies (LEA), community organizations, and business and industry. When contacted by an employer, the SEA assesses LEA capacity to meet employer needs. If the LEA is found wanting, the deficiencies are remedied, or if that is not feasible, a different LEA is asked to provide the needed program. SEA officials readily confirmed that crossing LEA lines to provide services is not a problem. The SEA assists the appropriate LEA and the employer in developing a plan targeted to the employer's needs.

Until recently, most workplace adult education programs in Connecticut have been traditional GED, high school equivalency programs. About two years ago, the LEA launched a program to adopt the Comprehensive Adult Student Assessment System (CASAS) throughout the state. A validated program in the U.S. Department of Education's National Diffusion Network (NDN), CASAS provides criterion referenced assessment and curriculum management of competency based instruction. Developed in California using demonstration funds provided under the Adult Education Act, CASAS is used throughout that state in adult education, JTPA, immigrant amnesty, and welfare reform programs and in other states such as

Indiana, Maryland, and Michigan in similar applications. By 1990, all Connecticut adult education programs are scheduled to be competency based adaptations of CASAS. Because competency based programs identify specific skills and knowledge required in applications and can accurately assess an adult's ability to demonstrate mastery of competencies, they are appropriate to both workplace and adult life requirements.

In 1988, the SEA was considerably aided in its brokerage role with business and industry by state legislation permitting employers to access state basic skills funds through cash matching. Limited to a maximum of $20,000 per project, state funds may reimburse an LEA between 10 to 70 percent of instructional costs. A needs-based formula designed to reimburse poorer LEAs up to 70 percent, the formula generally favors urban areas where employment is centered. (Stamford, a wealthy LEA with Fortune 500 companies and a 12 percent reimbursement entitlement, was an exception cited.) Thus, an employer in a maximum entitlement area could generate $14,000 of state basic skills program funds by supplying $6,000 of its own funds. In working with employers, the SEA actively promotes release time programs because of the benefits to both learners and employers. Although a real cost, money paid to employees while in training does not qualify as matching for state funds.

Acknowledging the efficacy of the Aetna Institute program, SEA officials cited a project with Connecticut Bank and Trust Company (CBT) as more typical. Experiencing a 60 percent turnover of tellers, CBT sought assistance from the SEA and its

local Community College. In accordance with its legal interpretation of hiring constraints, CBT did no testing of applicants. Although CBT gathered no data on the basic skill competencies of tellers after they were hired, the consensus among supervisors was that basic skills deficiencies were a major factor in the turnover rate.

Unlike Aetna, CBT had a very limited budget for training. Unable to generate cash matching to generate state basic skills funds, CBT was attracted to the local community college charges for employee training compared with other vendors. (In Connecticut, community colleges earn state funds on a full time equivalency formula which apparently accounts, at least in part, for their lower charges to employers). Over time, the SEA assisted in developing a plan whereby educationally disadvantaged applicants were given basic skills training by the Hartford LEA in a program designed around banking competencies. CBT guaranteed those successfully completing the course an interview for employment. The community college supplied an employee training component for those hired.

Although no data is available on benefits accruing from the CBT program, those most closely affected feel it is successful. If basic skills deficiencies were a major cause of teller turnover, tellers should be both more effective and more satisfied in doing their tasks.

Serving only as a broker of services, the SEA functioned still differently in a program with Local 1199 in New Haven. Under a union-management agreement, funds were accumulated to

train represented nursing home employees. When the fund reached about $200,000, the union president called the SEA for assistance in establishing basic skills programs for local union members. Bringing together the New Haven adult education program and the Jewish Home for the Aged with Local 1199 officials, the SEA developed a basic skills program for low-level employees designed to give them opportunities beyond dead-end jobs. The program now includes a pre-health education program designed to give employees the competencies required to pass the Licensed Practical Nurse training entrance exam. SEA officials praised the union president's skill in involving all levels of nursing home management in understanding and supporting the program. When needed, he also authorized reimbursement to the Home for release time training costs.

SEA officials repeatedly emphasized that throughout their contacts with employers, human resource development staff and supervisors are thoroughly convinced of serious basic skills deficiencies among employees. They do not have to be sold on the need. A small state geographically, SEA officials are in touch with a wide spectrum of employers. Whether the awareness is a result of the impact of technology on Connecticut employers or the SEA's long standing role as broker, or both, is not clear, but it does contrast with some employers' awareness in other states.

New York: A State/Regional Economic Development Perspective

In 1983, the New York State Board of Regents created the Employer Specific Skills Training Program (ESSTP) to improve the capacity of schools to respond to the needs of business and industry. Designed to specifically address the gap between job demands and worker skills, the Program combines federal and state funds with close coordination among all education providers (including proprietary schools, community-based organizations, and labor unions) and state economic development resources.

- The State Education Department sets the goals to be achieved through the Employer Specific Training Program.
- The Bureau of Economic Development Coordination insures the effective use of funding and other resources devoted to meeting the program goals.
- A network of ten Regional Education Centers coordinates local educational services in response to the needs of business and industry.
- Post-secondary institutions, BOCES, local education agencies, and other providers across the State develop and deliver Employer Specific Training projects for employers.1

The Program provides assistance to employers to assess their workers' training needs, to develop custom designed curricula, and to train their workers. In the year 1987-88, $10,205,000 from five combined federal and state sources were allocated which generated nearly $35,000,000 in additional private and public sector funds and in-kind contributions (Pie Charts 1-4).2 Almost

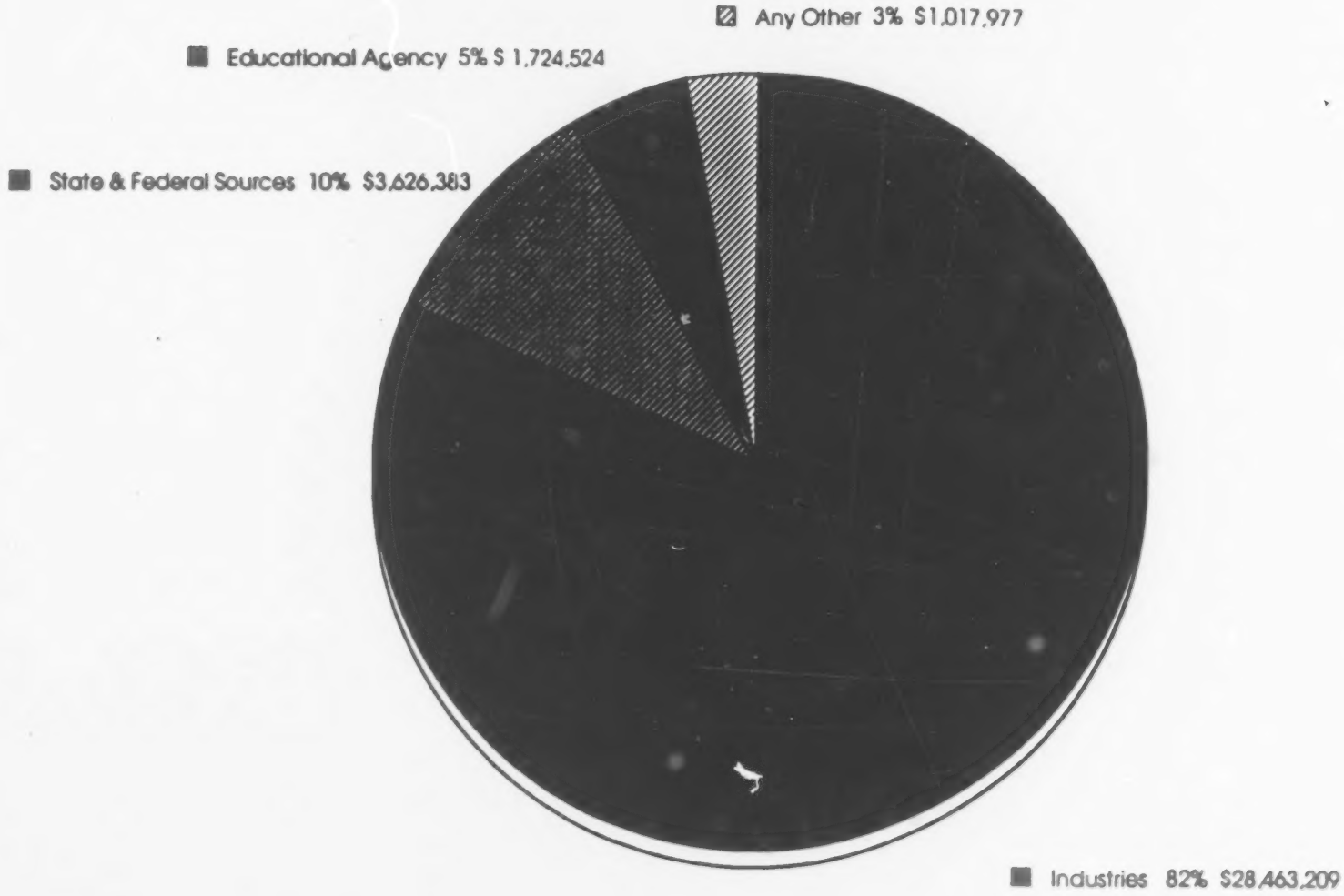
$6,000,000 of the allocated monies were supplied from state Employer Specific Training funds, the remainder coming from federal JTPA and Vocational Education Act funds. A total of 503 projects (Pie Charts 6&7) upgraded the skills of over 37,000 workers with another 2,500 dislocated and disadvantaged being placed in permanent jobs. Over half the programs served manufacturing firms. Sixty projects (12%) provided small business assistance training, 118 (24%) addressed the needs of new hires, and the remaining 325 (65%) provided upgrading and retraining.

One of the most impressive features of the ESSTP is its ability to provide skills upgrading for small and minority-owned businesses:

- Eighty-seven percent of all companies served in 1987-88 employed less than 100 workers.
- Minority-owned business accounted for thirty percent of the total firms participating in Employer Specific Training projects.
- Twenty-four percent of all companies served were owned by women.
- An additional 2,500 self-employed entrepreneurs improved their business planning and management skills.3

Training programs addressed all sectors of the economy (Bar Graph 1) and included a wide range of methods to increase productivity and improve product quality. Programs ranged from basic skills and workplace literacy to Computerized Numerical Control Machining, CAD/CAM, and zero-defect manufacturing.

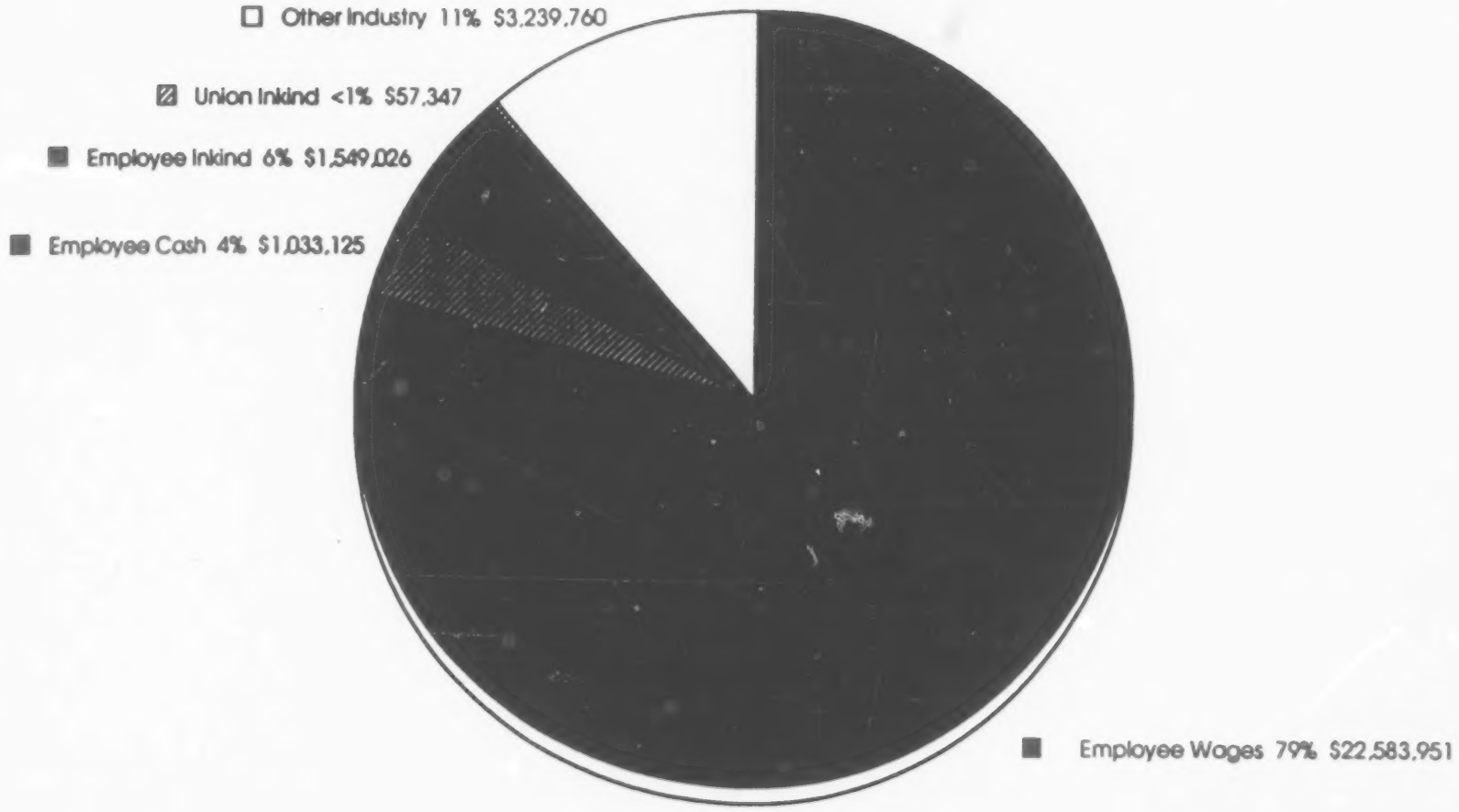
Matching Funds



Pie Chart 1

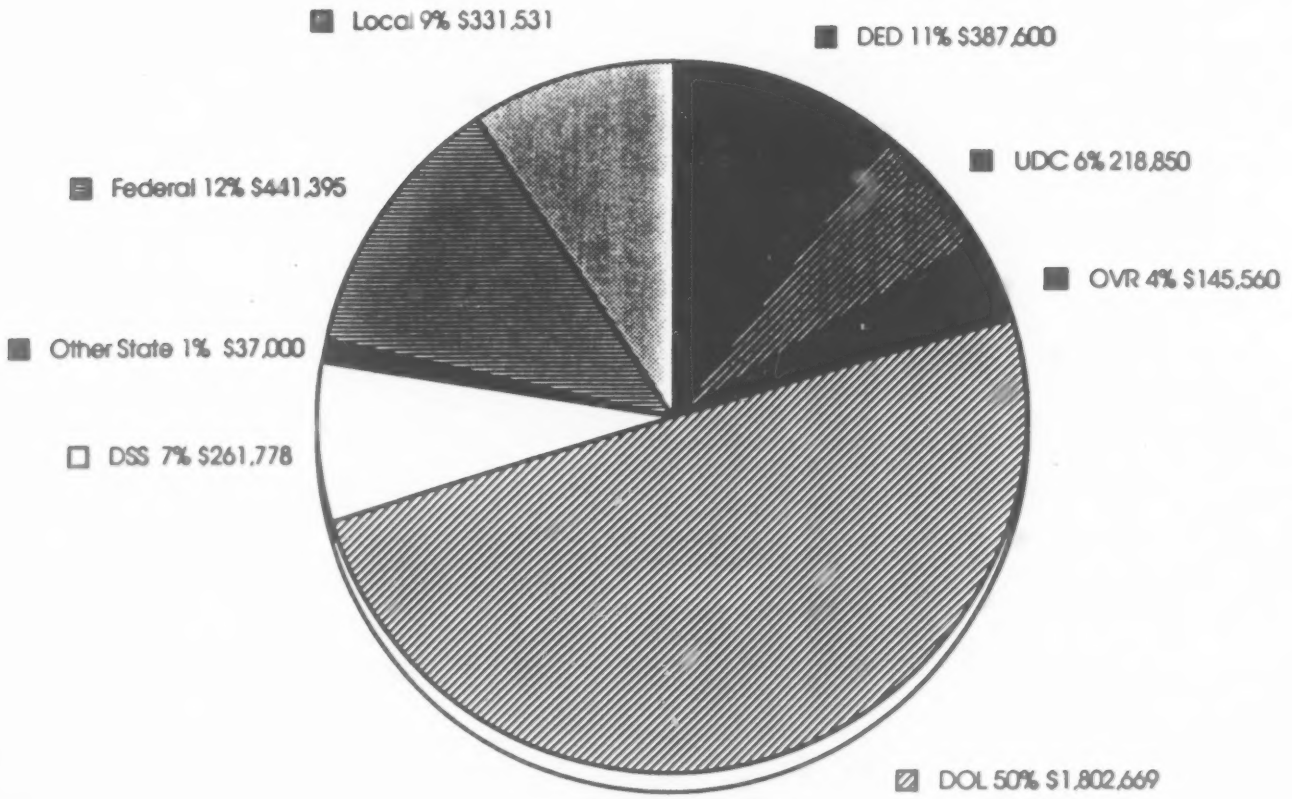
Total $34,832,093

Industry Matching Funds



Total $28,463,209

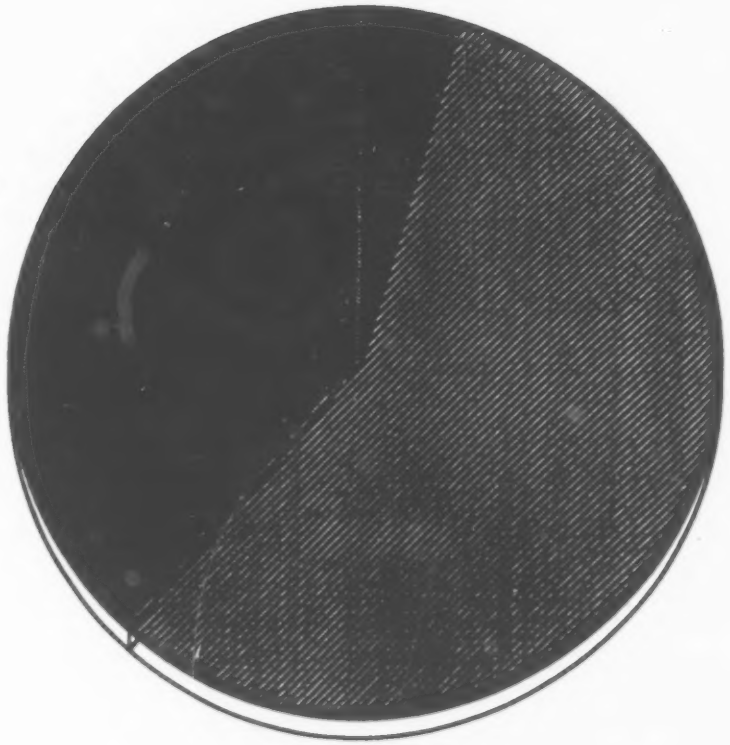
State & Federal Matching Funds



Total $3,626,383

Pie Chart 3

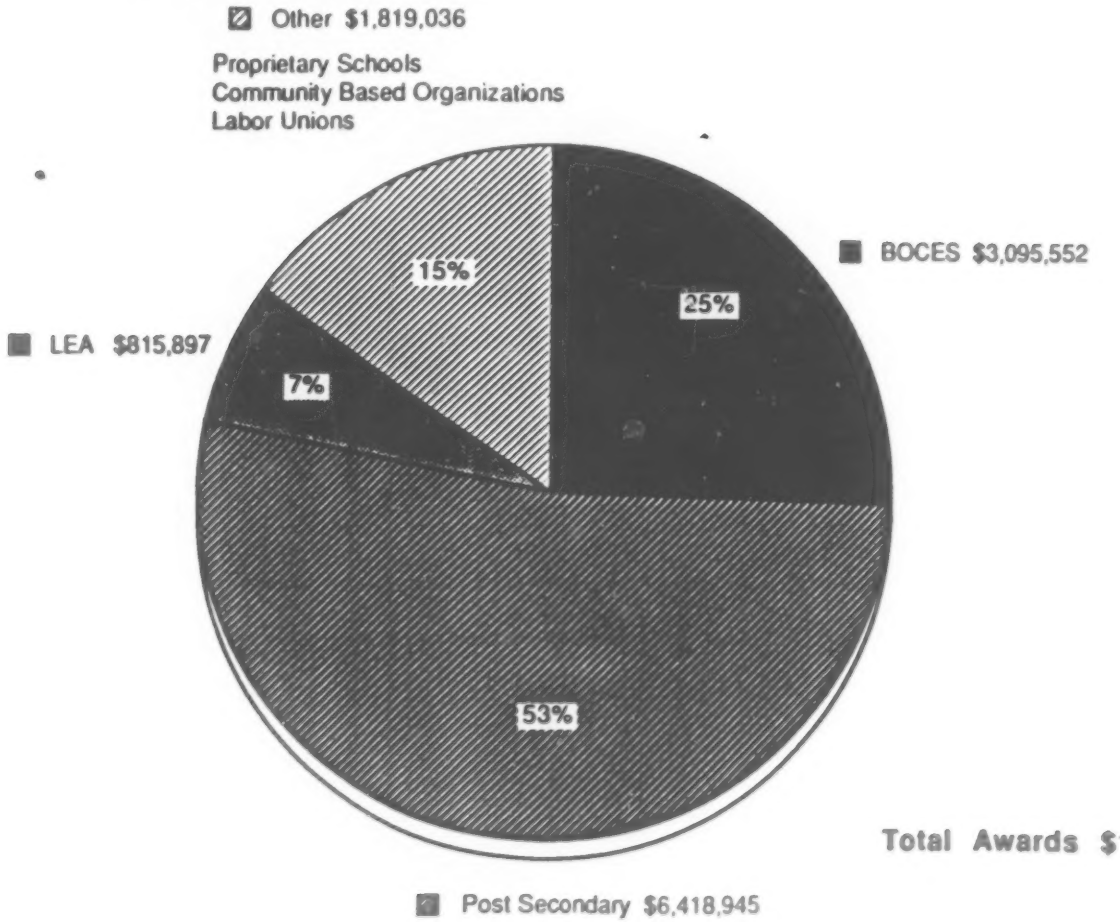
Educational Agencies Matching Funds



Total $1,724,524

Pie Chart 4

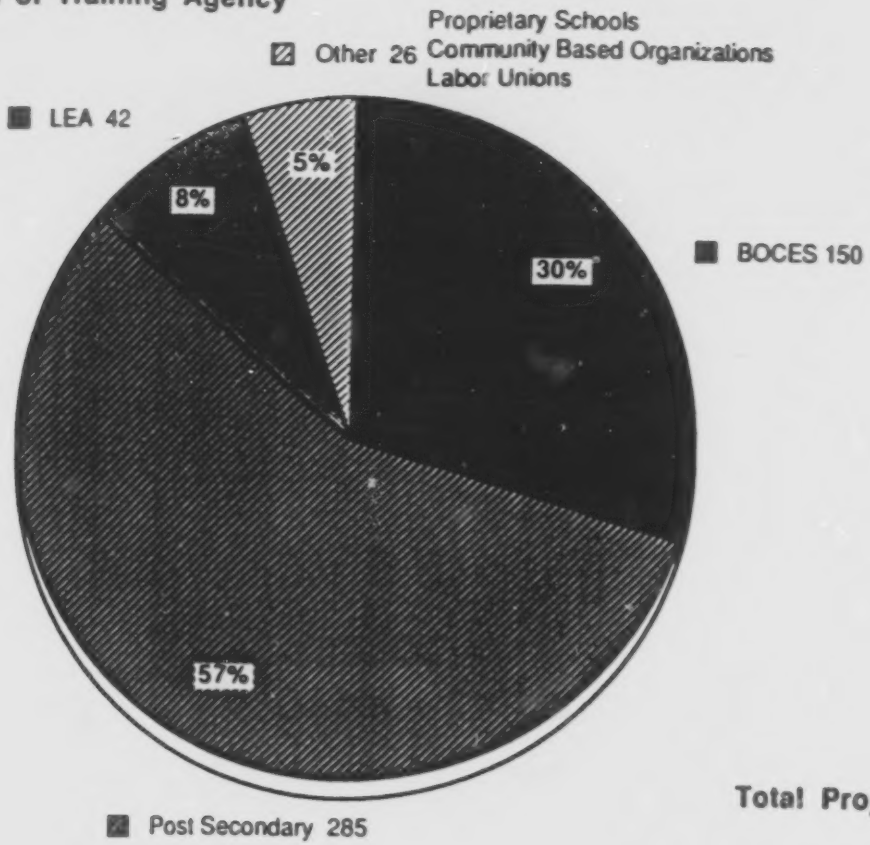
Grant Awards by Type of Training Agency



Total Awards $12,149,430

Pie Chart 5

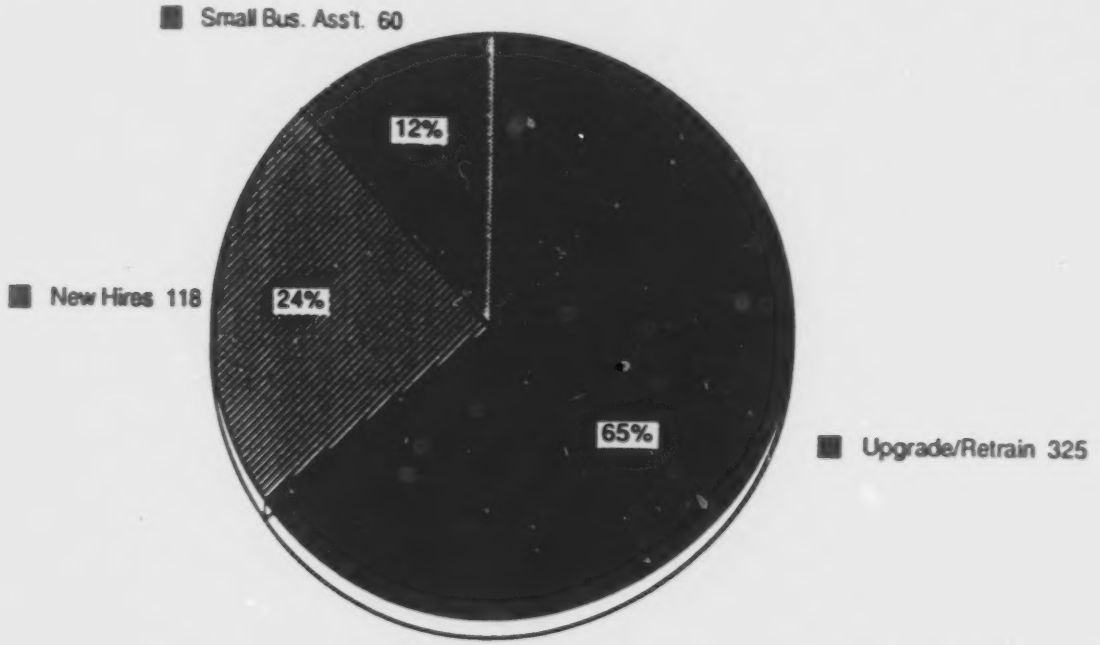
Projects by Type of Training Agency



Total Projects 503

Pie Chart 6

Type of Training Project



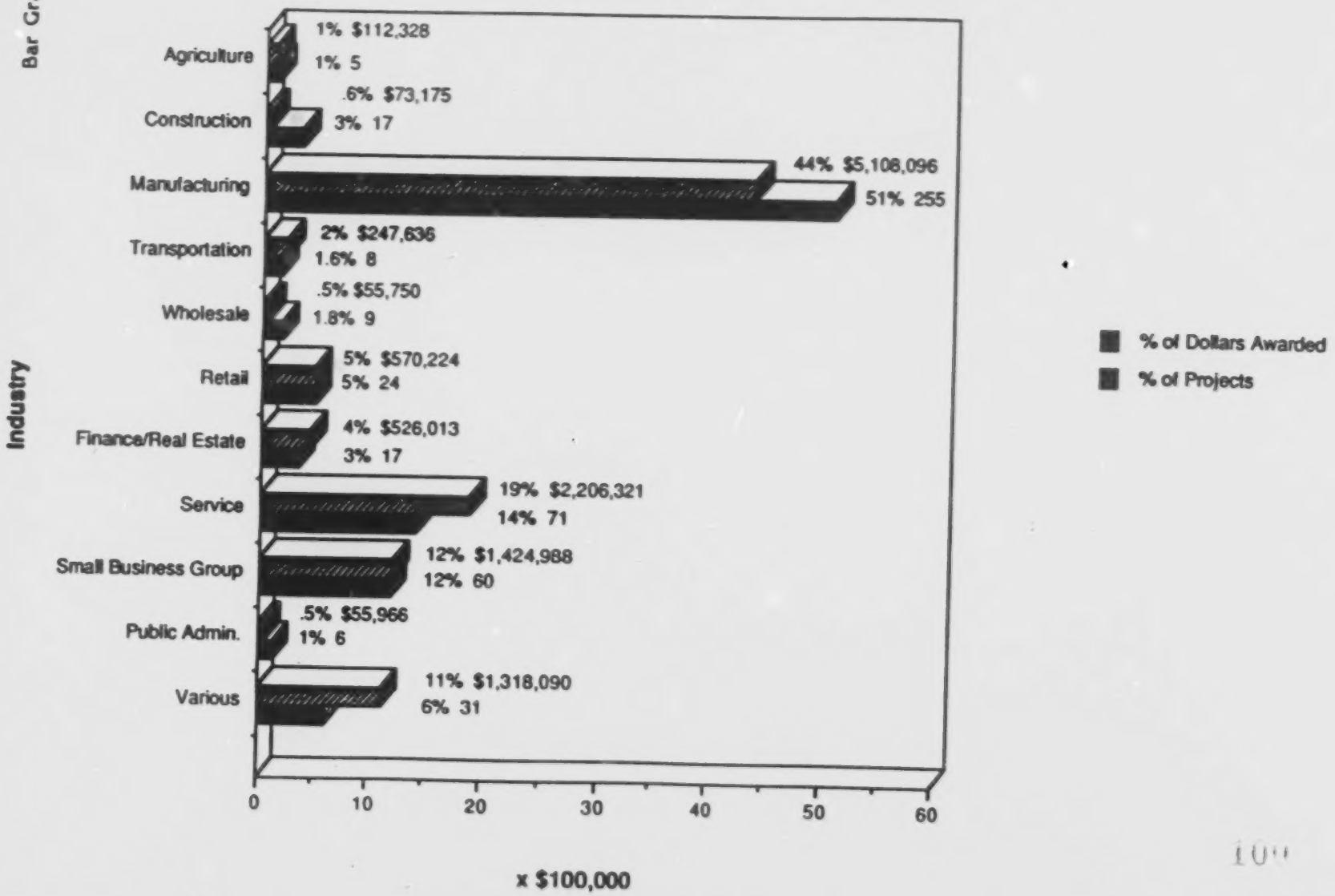
Total Projects 503

Pie Chart 7

Bar Graph 1

Projects / Awards by Industry Type

503 Projects - $12,149,430 Awarded



The Finger Lakes Regional Education Center for Economic Development headquartered in Stanley, New York, serves the West Central area whose major population center is Rochester. Heavy in manufacturing industries, it contains large employers such as Eastman Kodak (50,000 employees), Bausch & Lomb, Xerox Corporation, and AC Rochester and Delco Products plants of General Motors. In 1988, the Finger Lakes Center supported programs in 189 organizations -- 131 of which had fewer than 100 employees -- on a program and administration budget of about one million dollars. Training and education programs were delivered by 14 educational entities in the region: 3 institutions of higher education, 3 community colleges, 6 BOCES, and two area school districts.

The Finger Lakes Center philosophy of program design and delivery of job related basic skills training is articulated in a Center publication, Workplace Literacy: Raising the Floor of Education in the Workplace by the Center's Director, David Mathes. Appropriate to the concentration of regional industries, Mathes distinguishes "manufacturing literacy" as a species of workplace literacy. "Manufacturing literacy and its more generic counterpart 'workplace literacy' may look similar to general basic literacy but they differ in intent. While general literacy looks to the general development of the individual Workplace Literacy seeks to meet the goals of the individual and the employer at the same time. That is to say, the driving force behind mathematics training will be to solve SPC problems. Oral communications skills and listening will be directed to the needs

of the work cell and the work environment and reading comprehension will be driven by the new technical manuals that have been purchased by the company." With frequent citations of Sticht, Mikulecky, and others, Mathes shows a critical understanding of the central role of the organization's mission and goals and of the higher level demands of job related basic skills. "MANUFACTURING LITERACY ... is roughly defined as the ability to read and write at the twelfth grade level, to speak and listen with clarity and understanding in a team or work group, to have mathematical skills at a twelfth grade level sufficient to handle SPC problems, to have problem solving skills, and to have basic computer literacy skills.."4

While wholeheartedly committed to contextualizing curriculum and materials to the specific occupational setting of the worker, Mathes underscores the need to develop workplace generic competence. "The emerging workplace is such, however, that providing a very specific connection of literacy skills to specific job tasks may not be productive since much of the work is undergoing change anyway. That is to say, that a generic approach that includes the elements of reading, writing, speaking, listening and mathematics with decision making skills and basic computer literacy to at least the 12th grade level with a general workplace orientation might be a much more effective use of employee time and enhance the cost effectiveness of the total effort."5

Consistent with Mathes admonition that "materials developed should be prepared specifically for workplace settings and not be

high school, or standard ABE, GED, ESL material as the 'one size fits all' approach,"6 the Center is sponsoring the development of "A Working Curriculum," four volumes of which are now available. (The entire curriculum will be available through ERIC).

Volume 1: Workplace Oral Communications

Volume 2: Workplace Mathematics, Modules 1 & 2

Volumes 3 & 4: Workplace Written Communications, Modules 1-9.

The entire Finger Lakes Center program acknowledges workplace basic skills as essentially different from generic academic basic skills.

The Finger Lakes Center's integrated training services constitute its "Manufacturing Excellence Program." The program assigns responsibility for training in various technologies to educational institutions by levels of technological sophistication. Entry level programs are conducted by BOCES and School Districts, mid level by Community Colleges, and advanced level by institutions of higher education, especially the Rochester Institute of Technology (RIT). RIT also is responsible for training and certifying instructors at all levels and for annual update training in technological developments.

The following three pages from Finger Lakes Center publications amplify the Manufacturing Excellence Program and the system supporting it.

MANUFACTURING EXCELLENCE PROGRAM

The Regional Center MANUFACTURING EXCELLENCE PROGRAM is designed to provide WORLD CLASS EXCELLENCE training in a variety of technologies most identified by industry as critically in need. The program works in the following way:

1. In an agreement with the Regional Center as the agent for the companies and educational agencies of the region a number of technologies have been identified (the first identified in the Finger Lakes Region are TOTAL QUALITY MANAGEMENT, INTEGRATED MANUFACTURING and INSTRUCTOR TRAINING).

2. RIT, in cooperation with the Regional Center, jointly develop a curriculum for instruction which is clearly state of the art and divides the curriculum into three parts:
   a. entry level training for the technology
   b. mid-level training for those that have completed entry level
   c. high level training in the technology.

3. Cooperatively the Regional Center and RIT identify staff from educational agencies of the region to train them in delivery of the curriculum.
   a. LEA and BOCES personnel are mainly identified for Entry level training.
   b. Community College personnel are identified for Mid Level Training.
   c. RIT faculty are identified for high level training.

4. Instructors are trained and certified by RIT as able to deliver the curriculum at the highest level of excellence.

5. Agencies deliver training to this high standard as requested by industry.

6. A certificate from the Regional Center and RIT is awarded for completion.

7. Evaluation and monitoring of instruction is provided by the Regional Center.

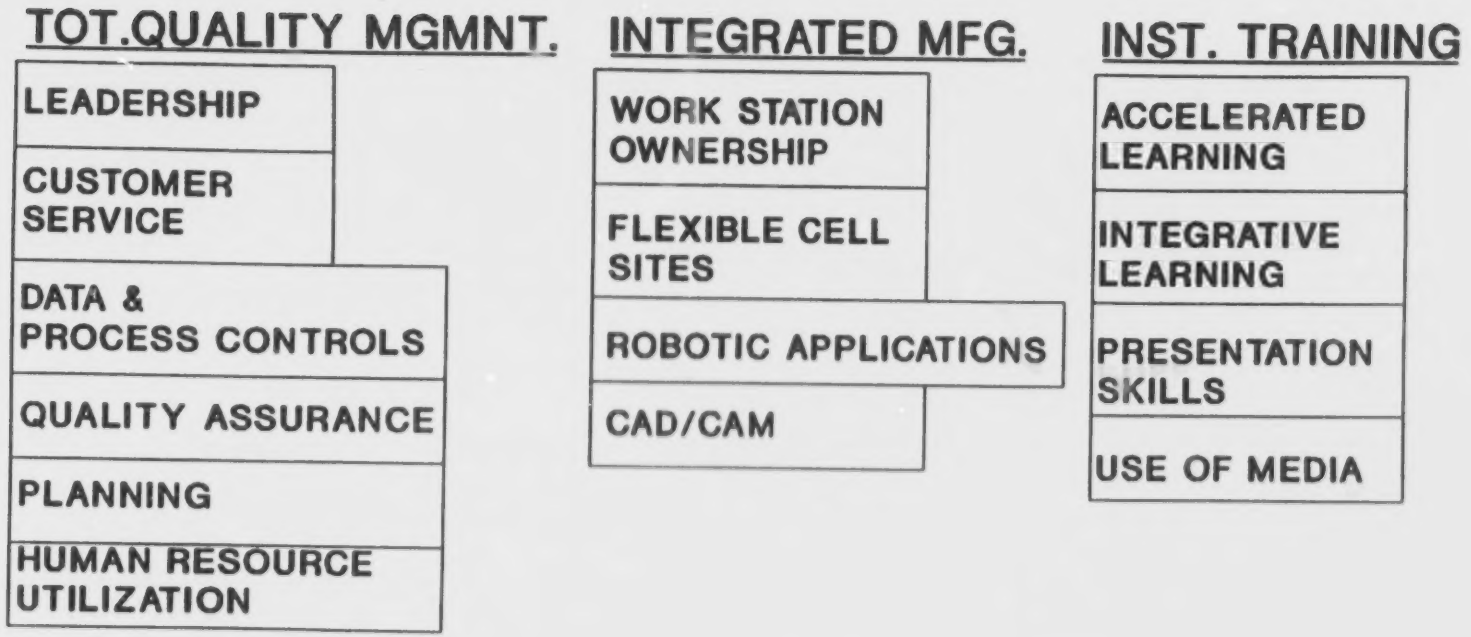
8. Instructors participate in ongoing training on a yearly basis in the technology through RIT.

Areas of instruction under the program include: TOTAL QUALITY MANAGEMENT: (STATISTIC PROCESS CONTROL, BLUE PRINT READING, JUST-IN-TIME , DECISION MAKING/ PROBLEM SOLVING), INTEGRATED MANUFACTURING (FLEXIBLE CELL SITE MANUFACTURING, CAD/CAM, WORK STATION OWNERSHIP, ROBOTIC APPLICATIONS), INSTRUCTOR TRAINING. A business/industry advisory committee is being developed for the program and agencies that participate in the program will also be invited to participate in the process.

MANUFACTURING EXCELLENCE PROGRAM

- ✓ RIT CERTIFICATE PROGRAM DEVELOPED IN TOTAL QUALITY MANAGEMENT, INTEGRATED MANUFACTURING,INSTRUCTOR TRAINING.
- ✓ RIT CERTIFIED INSTRUCTORS:
  ENTRY LEVEL: BOCES & LEA
  MID LEVEL: COMMUNITY COLLEGE
  ADVANCED LEVEL: RIT
- ✓ RIT CERTIFIES QUALITY OF INSTRUCTION
- ✓ WORKFORCE TRAINED BY APPROPRIATE AGENCY
- ✓ CERTIFICATE AWARDED BY RIT & REGIONAL CENTER

MANUFACTURING EXCELLENCE PROGRAM



FINGER LAKES REGIONAL EDUCATION CENTER

The Basic Skills and Workplace Literacy track of the Manufacturing Excellence Program is called the Manufacturing Skill Readiness Program Initiative. It constitutes a good part of the entry level program conducted by BOCES and School Districts but is subject to the same quality control and professional development standards as all other components.

The Finger Lakes Center has been successful in imposing some rather demanding conditions on all employers they serve. The following conditions are taken from a Center announcement flyer to prospective clients.

1. Employers must pay-time-off or provide release time for their employees during the period of training.
2. Funding cycles of the program are dependent on the amount of the program and the type of training conducted. Training must be by qualified agencies.
3. The program is competitive and contact must be made with the regional center so that there is time to plan.
4. Time Line: typical time line from concept to funding is 30 to 90 days.

The fact that the Center covers most direct instructional costs is no doubt an incentive for applicants to meet these conditions. However, release time costs can run from 3 to 10 times that of instruction, and the fact that the program attracts enough applicants to be truly competitive testifies that clients feel they are getting quality returns for their money.

In the case of some small employers, Mathes concedes that it is not always feasible to hold out for release time or pay for

time off. In those cases, he may negotiate a shared time arrangement in which employees contribute an hour for an hour of paid time. However, arrangements less than that are not entertained.

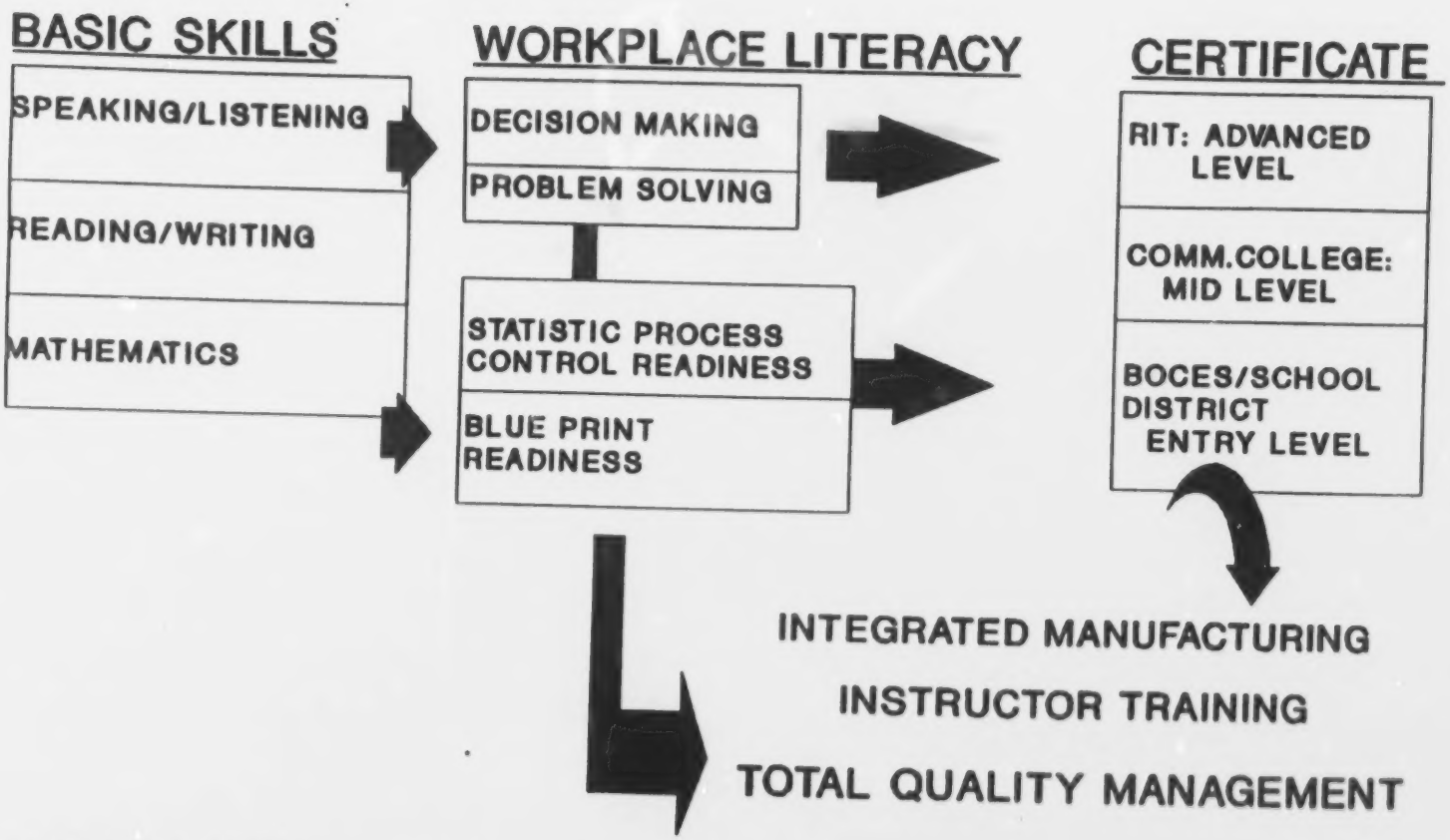
> Our experience has shown that models that have at least a sharing of 50% "on the clock" are the only successful models that meet the company goals. Otherwise the ability spread (between worker skill and job requirements) continues to be a problem for the companies.7

This ability to take the company's viewpoint and to hang tough as a professional educator is a crucial factor in the success of the Center's program. Unfortunately, it is not a sufficiently common quality among educators.

The flow chart on the following page details the Manufacturing Skill Readiness Program Initiative.

In the pages following the flow chart, selected basic skill and workplace literacy projects currently funded are summarized. These serve to give an important specificity to the scope of the contextualized services the Center and its regional educational agencies provide employers.

MANUFACTURING SKILL READINESS PROGRAM INITIATIVE



FINGER LAKES REGIONAL EDUCATION CENTER

SELECTED BASIC SKILLS & WORKPLACE LITERACY PROGRAMS
Finger Lakes Regional Education Center for Economic Development

Company	Size	# Trained	Need	Description	Agency	Ctr./Agency Cost	Employer Costs: Wages	Space	FTEs	Other	Total
Lucidol/Pennwalt Corp.	160	155	Lucidol faces fierce global competition. Customer demands require instituting SPC	Skills upgrade in Statistical Process Control & design of experiments. Mpl. Lit. involves basic math: statistics, chart making & basic calculations. SPC training will follow workplace literacy.	Genesee Community College	$7,666	$24,500		$2,202	$7,320	$34,022
Parker-Hannifin Corp.	550	500	Not available	Firm specific math (add., subtract., multiply, divide, & decimals; firm specific blueprint reading; taking measurements, & basic understanding of SPC principles; intro. to variables & attributes. SPC includes use of video instructional aides.	Wayne-Fing. Lakes BOCES	$8,986	$52,000	$5,000	$3,520		$60,520
Lawless Container Corp.	60	60	Customers require higher quality thru SPC. Co. scheduled to install new technology next yr. requiring upgrading.	Workplace Literacy math followed by quality awareness raising and SPC as a tool for quality improvement.	Genesee Community College	$9,324	$14,400		$6,776		$21,176
AC Rochester Prods./IBM	6000	300	A curriculum is needed to bridge the skills of traditional ABE, GED, & ESL programs the basic math skill needs of take workplace leading to firm specific training as a followup.	A curriculum will be developed in workplace math. Curr. will identify common branch skills necessary for basic workplace math & bridge to those needed for firm specific programs. This is a follow up curriculum & will complete the components for math to the 12th grade lvl. using a format approved by Reg. Center.	Rochester Cty. Sch. Dist.	$5,000	$3,500,000			$10,000	$3,510,000
Chloride Electro Metals.	350	40	Changing technology and plant expansion necessitate upgrade training.	Two components: basic math and intro to SPC for operators; computer lit. w. spec. software.	Genesee Community Coll.	$9,555	$12,250	$2,000	$5,960		$20,210
Eastman Kodak Co.	50,000	150	Kodak, the PIC, Roch. Cty. schls. and Reg. Ctr. have identifies a pilot gp. for workplace lit. training using applied technologies.	A pilot to research the validity of IBM PALS with 2 populations: Kodak wkrs who do not test at H.S. grad. level and PIC identified low income, unemployed.	Roches. Cty. Sch. Dist.	$35,000	$134,000	$20,000 (Equipment)		$34,000	$188,000
Lapp Insulator	600	8	Technological changes require upgrading maintenance employees. The curriculum	Group is a pilot for curr. specially designed for co. Includes: Mapl math,	Genesee Community Coll. & Genesee Wyoming BOCES	$7,827 plus $5,800	$24,000		$5,075		$29,075

SELECTED BASIC SKILLS & WORKPLACE LITERACY PROGRAMS
Finger Lakes Regional Education Center for Economic Development

Company	Size	# Trained	Need	Description	Agency	Ctr./Agency Cost	Employer Costs				
							Wages	Space	FTEs	Other	Total
			is a bridge to more advanced training.	reading, lang. skills & blueprint rdng.		state & fed.					
Pfaudler	350	30	Automation, participatory mgmt. work cells, & SPC require worker upgrading.	84 hr, 2 phase prog. in tech. math & communications. Basic SPC skills including algegra & geometry. Oral comm. skills required for work cells.	Monroe II BOCES	$3,330	$15,530				$15,530
Chardon Rubber Co.	100	100	Customer mandated SPC.	Basic math for all prod. employees to prepare for SPC. SPC follows. An additional 10 supervisors will also be trained.	Genessee Community Coll.	$10,080	$15,210		$8,008		$23,218
Eastman Kodak Co.	50,000	25	Instructors need training in effective techniques in teaching basic skills.	40 hours training in Teaching Skills for Professional Deliverers of Training to production workers.	Consultant staff & Integrative Learning Associates.	$24,074	$20,000			$8,000	$28,000
Lapp Insulator	600	250	Technological change requires upgrading	Curriculum will be developed to teach	Genessee Community Coll.	$5,000	$40,000				$40,000

Conclusion

The New York state and regional system for improving the capacity of schools and other deliverers of education and training could serve as a model to other states. While other states have linked adult training and education with economic development, none examined equals New York's integration of the levels of educational expertise in relation to employer and workforce needs. The integration of workplace basic skills with other workforce training is essential if the true basic skill requirements of workers are to be most effectively addressed. A basic skill program standing outside the world of work and worker training is not likely to recognize the essentially different character of the basic skills required. And if it does, it is not nearly as likely to address these requirements in the most efficient and effective models. Undoubtedly, other states will want to adopt mechanisms more appropriate to their histories and existing organizations, but they will do well to study New York's system and take care to incorporate its principles of knowledge and researched based training, professional development and quality standards.

Another aspect of the New York system not germane to this study should not go unobserved. The integration and coordination of existing educational systems in more effectively responding to the needs of business and industry has a very wholesome effect on the entire K - 16 system. By increasing the responsiveness of all levels of education to the learning needs of adults in the workforce, that system will inevitably become more responsive to

society in carrying out its mission of educating children and youth. In the short or long term, it may be the most effective strategy for educational reform and improvement.

11,

Houston Community College: An Urban Perspective

Houston, Texas

Founded in the early 1970s, Houston Community College (HCC) System currently serves about 100,000 students, approximately half of these in academic and occupational education credit courses and haif in non-credit extension and continuing education programs. All non-credit courses are administered by the Dean of Continuing Education and include extensive programs in Adult Basic Education (ABE), Adult Secondary Education (ASE), and English as a Second Language (ESL). In the current program year, these latter programs will serve about 24,000 persons in ABE and ASE and 36,000 to 40,000 in ESL, including about 30,000 in the Houston area amnesty education program.

Other than the new amnesty education funds received this year, HCC's basic skills and ESL programs are funded through an annual allocation of state and federal funds from the Texas Education Agency (TEA) located in Austin. Each annual allocation is based on HCC's previous year contact hours in ABE, ASE, and ESL, thus encouraging providers to maintain or exceed the level of services provided the previous year. Texas state adult education funds are provided annually through a categorical budget line item with no provision for generating additional state funds through a flexible state aid formula such as full-time-equivalency.

Within the Adult and Continuing Education Department, basic skills and ESL programs are administered principally by an Adult

Secondary Programs Division while the amnesty education program is administered under the Community Services Division. Because amnesty education program funds are directed to immigrants who are employed, that educational program has no job readiness nor workplace literacy orientation.

Beginning in 1977, the Adult Secondary Programs Division has conducted an annual basic skills/ESL business and industry needs survey. A simple one page form essentially unchanged since 1977, it solicits information on numbers of people trained in the organization in the current year and those needing training the following year. Mailed to over 350 employers of 200 or more employees, the Division realizes about a 25% response rate that provides much of the information for business and industry programs funded during the following twelve months. Although the list is based on the best available information, some responses show actual employer sizes as low as 50 employees.

State funds are constrained to cover teacher salaries and materials. The additional pressure to maintain previous contact hour levels results in no funds for developmental purposes. Thus, HCC's ABE, ASE, and ESL programs are generic in nature. However, in their instructional component, they are competency based and life skills directed following the guidelines contained in the 1984 Texas Adult Education Curriculum Guide. This guide applies and extends the research findings of the federally funded Adult Performance Level (APL) project completed in 1976.

Under the leadership of its Dean of Continuing Education, HCC staff are knowledgeable and resourceful in customizing basic

skills programs to specific workplaces, but without developmental funds, customizing is only possible when an employer is willing and able to fund all or part of the program cost. This rarely happens. When it does, the Adult Secondary Programs Division turns the program over to its sister Community Services Division. At present, and almost beyond the memory of current staff, there are no customized workplace programs supported by state grant or local private funds. A federal Workplace Literacy grant supports the single customized basic skills program among some 30,000 adults served.

With a standardized curriculum and no developmental funds, the Adult Secondary Programs Division's efforts are centered on negotiating release or shared time for employed participants and to monitoring and reporting programs. Division efforts focus on organizations too small or economically viable to have training budgets and are usually successful in having employers provide on-site space for instruction. In addition to for-profit organizations, the Division has a long history of providing programs for Houston public works and public parks divisions.

Understandably, HCC's basic skills programs meet with varying degrees of success. One of the more successful programs involved 35 maintenance employees of a non-profit private hospital. Hospital management was experiencing problems in employees' handling of dangerous and toxic chemicals, attributable in part to a lack of basic skills among maintenance workers. HCC personnel negotiated a 50/50 shared time program for maintenance employees, most of whom scored below the 5th grade reading level.

Using the general life skills curriculum developed by the University of Texas at Austin, a 180 hour program (3 hours, twice a week for 30 weeks) brought most of the group to a 9th grade achievement level. At HCC's insistence, basic skills classes were systematically supplemented with presentations on dangerous and toxic chemicals by qualified hospital personnel.

In one case some years ago, a local hotel discontinued a voluntary after-hours ESL program -- no release time was provided -- because of the high number of participants who left hotel employment for better paying jobs as soon as their English language skills improved.

HCC staff regard a recently concluded program with Igloo Corporation as one of their most successful. About 1982, company officials found new technology and training required upgrading employees. Working with company personnel, HCC identified 48 employees needing high school equivalency skills, some of whom tested below the 4th grade level. Under a full release time arrangement, the program experienced a 90% success rate, including an ESL component that was later added. Company awareness and support for the program provided a climate in which the instructional program could be customized to address the specific workplace applications.

But not every effort to target training to workplace needs has met with success. After preliminary discussions with a human resource development specialist at an area Nabisco plant, HCC staff proposed using task analysis to customize the training in a plant of 800 employees. The company would not entertain any form

of release time but wanted to provide basic skills instruction through a 25 computer mobile lab that would also support the plant transition to computerized operation. HCC was willing to take this approach and invested heavily in trying to develop a program
to meet the employer's objectives. Throughout the negotiations, HCC staff were prohibited from talking with union officials in a strongly represented plant. The company hired a trainer who had conducted traditional GED programs in another state. The task analysis approach was rejected; money to provide the computerized lab was not provided, and the company offered a traditional in-house GED program on a voluntary after hours basis. No data or feedback are available to HCC staff on program results.

In 1988, HCC received a Workplace Literacy Grant of $297,000 from the U.S. Department of Education. A partnership between HCC and AFL-CIO Local 1550, the grant supports the first union/public education program in Texas. HCC initiated contact with Local 1550 regarding the training needs of maintenance and service personnel employed in an antiquated and overcrowded hospital. Two new public hospitals in the Harris county district are replacing the old institution, and personnel in the new hospitals are required to have a high school equivalency to get into a retraining program. This triggered heightened concern by union officials that many current employees would lose their jobs because of basic skills deficiencies. A proposal to provide basic skills, high school equivalency, and life skills training for 400 employees resulted.

When funds became available in January 1989, a full time director and two full time teachers were hired. About the same time, the union official who had been instrumental in forming the partnership left. When courses were first offered, students did not come forward.

A former Peace Corps Volunteer, the project director is a self-effacing young man ("I don't mind. You can have all the credit," he says) with highly developed community development and interpersonal skills. Although not part of the original partnership, he has developed what he calls an "unintended partnership" with hospital management. The original partnership with the union has been re-formed with the new officials largely through the director's skills in helping them learn new roles in promoting the program and recruiting students. Grass roots contact with workers revealed they were interested in short term, job related courses rather than a GED program, and that they wanted them on the job site, after hours. A "Career Opportunity Program" offers short term courses in reading, speaking, and writing improvement, math improvement, and report writing improvement (see sample flyer). A "Job Survival Skills Course" available to those enrolled in short term courses cover such topics as time management, stress management, team building, and dealing with difficult people. The program was promoted through small group meetings in which courses were presented as providing skills needed on the job and for transfer and promotion. Six months after the project began 10 classes had been completed and another 15 were in progress totaling over 200 participants.

In Partnership With

Remember
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Never
Too
Late
To
Learn

Houston Community College System

Career Opportunity Program

Houston Community College System, in partnership with Local 1550, is offering **Free Adult Education Classes** to help you meet the changes you may face in the workplace.

Register Now for:

- Reading Improvement
- Speaking Improvement
- English-As-A-Second Language
- Writing Improvement
- Math Improvement
- GED/High School Certificate
- Report Writing Improvement

A Job Survival Skills Course will be made available to all students enrolled in any of the above courses. Among the topics covered are:

- Time Management
- Coping With Change
- Stress Management
- Team Building at Work
- Communications on the Job
- Dealing With Difficult People

For More Information Call

Faye Cole at 928-3738 or Samuel Massie at 630-7287

Within this job related context, HCC personnel are using the TABE to gather baseline basic skills information on participants. Both pre-test and post-test data are collected.

Using Education Technology

A former State Director of Adult Education in North Carolina and New York, the Dean of Continuing Education at HCC is a strong supporter of educational technology. This is manifested, on the one hand, in the most extensive use of computer assisted instruction among sites visited, and, on the other, by a healthy skepticism of the cost effectiveness of those applications. HCC is currently using the systems of Computer Curriculum Corporation (CCC), the Comprehensive Competencies Program (CCP), and the IBM PALS. In its JTPA program, Control Data's PLATO is also used. Rather than subscribe to a single system, HCC's learning center integrates all the systems, endeavoring to apply the most appropriate software to different learning needs.

In December 1988 an evaluation was concluded on the use of CAI in HCC's Job Training Partnership program. Conducted by the Texas Center for Adult Literacy and Learning of Texas A&M University, participants were found to be learning at significant rates both in their skills and their efficiency at working with the systems. The following findings are those most useful to generic CAI applications:

> The CAI systems are most useful supporting reading and mathematics instruction, although upper level students benefit substantially from the language components of the CAI systems.
>
> With lower level students, the more effective CAI

systems are those that are integrated with traditional teacher/student instruction. CAI systems are excellent support systems for instruction, but do not replace the need for teacher/student interaction.

Upper level students, who have a stronger skills base than students in lower groups, are the best equipped to work with CAI systems in self directed modes. It is necessary for students to have a reasonable background of basic skills before they are prepared to work exclusively with CAI systems that are not designed with ongoing teacher interaction.1

Conclusion

HCC's Dean of Continuing Education and staff are steeped in adult education principles and practices and are collectively able to draw upon hundreds of years of program experience. They understand that workplace basic skills are different from academic basic skills and that learning is most effective when those skills are learned in the work context. As with most other programs, however, they do not have access to criterion reference assessment techniques and instruments and must revert to standardized tests designed to measure academic basic skills.

The staff's major frustration is that their expertise in customizing workplace basic skill programs is not generally known by area businesses and industries. One key staff member summarized it: "HCC is Houston's best kept secret." The problem is compounded by budgetary constraints and the absence of state authority or a formula for generating income for workplace programs. Unable to take a proactive role with the workplace, HCC reserves a certain amount of program funds each year to be able to respond to unforeseen requests. If funds were generated under a full-time-equivalency or similar formula, HCC could afford to be proactive in marketing its expertise.

Rockingham Community College: A Rural Perspective

Rockingham Community College, located in Wentworth, North Carolina, is one of 59 community colleges providing educational services throughout the state. From the beginning of its Adult Basic Education program in the mid 1960s, North Carolina designated its community colleges as the delivery system for all adult education services, regardless of the level of instruction involved. Thus, for about 25 years, basic skills education for adults has been provided by the same institutions primarily responsible for educational services to North Carolina's communities, and its businesses and industries.

Consistent with the purposes of the Adult Education Act, basic skills education in North Carolina has always been centered on serving educationally disadvantaged individuals rather than on serving employers. Thus, despite the ready linkage available through job oriented training also provided by community colleges, North Carolina's basic skills program is dominated by the traditional academic skills approach leading either to a high school diploma or a GED equivalency.

Rockingham county is situated in the north central part of the state. Its closest metropolitan area is Greensboro located just to the south in neighboring Guilford county. Rockingham county's northern border is also part of the border between North Carolina and Virginia. The principal industries in this rural county are textile manufacturing and brewing, the latter taking place at a Miller Brewing Company plant in Eden employing about

900 people.

At Rockingham Community College (RCC), adult basic and adult secondary education are administered by the Dean of Continuing Education, as are all other non-credit outreach programs. In 1988, the Dean received a call from a member of Miller's training organization seeking assistance in assessing employee readiness to learn new skills during the next five or more years. The projected demands were primarily based on an evolving management style that would increase worker control and support cross-training among work groups. Miller officials were concerned whether the current workforce had the basic skills required to assume the new roles over time.

Following an initial meeting with Miller officials, the Dean presented selected titles and responsibilities from the Dictionary of Occupational Titles designed to specify the skills and responsibilities to be targetted. Although the titles presented were generically related to Miller, plant officials did not feel the fundamental requirements could be addressed by such an approach. They expressed a desire to add a specialist to the discussions -- someone with a knowledge of basic skills programs and industry requirements.

RCC's President contacted adult education officials in the State Department of Community Colleges, and a specialist from a nearby state was recommended. Some time later, the parties met with the specialist to identify alternatives. Miller officials expressed a desire to have basic skills training as precisely targetted to job requirements as its other worker training. The

specialist recommended that RCC install the Comprehensive Adult Student Assessment System (CASAS), a program that would permit targetting specific basic skills competencies needed in both the short and long term at Miller. CASAS incorporates validated criterion referenced assessment instruments necessary to assess individual competence and to assure that employees master job related basic skill competencies.

North Carolina provides funds for adult basic education through a modified full-time-equivalency formula designed to work in conjunction with needs-based criteria. In RCC's case, the formula is generally adequate to pay teacher and instructional materials costs for a class of 10 or more students. Thus, unlike developmental efforts at Houston Community College, revenue to support ongoing basic skills in industry is automatically generated in North Carolina. Because Miller officials had no direct prior experience of basic skills instruction sponsored by RCC, the prospect of obtaining state supported instruction was for them an unanticipated benefit. The recommended approach combined with state support reinforced their desire to promote a full release time basic skills program.

Employees at Miller Brewing in Eden are represented by Teamsters International. Following the initial discussions already described, the specialist made a presentation to union officials of the proposed approach. Consistent with a history of constructive relationships between management and union at the Eden plant, union officials expressed support for the program. Because the training was to be entirely job related, union

officials took the position that it was management's responsibility to provide it on company time and at company expense. Since this premise was shared by Miller officials from the outset, further negotiations between management and union were not required.

The meeting ended with Miller inviting a proposal for embarking on the recommended course. Acting as the communication link between CASAS and RCC, the specialist prepared a proposal to support a pilot program in a selected department of Miller Eden. A major objective of the pilot was to develop the residential capability at RCC to do needs-based competency based training for Miller and other industries on a continuing basis. Following the pilot, RCC would be able to extend that training to other Miller departments and other employers in Rockingham county. RCC would also have the capability to continually assess employer basic skills requirements and deliver appropriate competency based training.

Several months later, a second meeting among RCC, Miller, and the specialist was held to discuss the proposal. Strategies were discussed for offering programs to employees on all three shifts, and there was general agreement that the project would proceed. RCC had had continuing discussions with officials in the State Department of Community Colleges (SDCC) who were interested in the pilot for possible statewide application for basic skills programs in industry. RCC subsequently decided to apply to SDCC for a demonstration grant to cover its developmental costs and provide an evaluation that would address SDCC's interest. Miller

agreed to fund the proposal that would cover the transfer costs incurred by CASAS and additional assistance by the specialist.

Some time later, a third meeting of the parties was held in which Miller officials surprised others by wanting to initiate the program across all departments and all shifts simultaneously. Production schedules would require a long term program with the first year cycle serving as the developmental period. RCC adjusted its proposal to reflect the broader scope and submitted it to SDCC.

Shortly after the proposal was submitted, Miller officials informed RCC that unforeseen budgetary constraints now required them to postpone the program. Expressing a continuing desire to move ahead, they cautioned that postponement was indefinite. RCC quickly revised its prosposal to install CASAS in its county-wide program but without a demonstration component specifically applied to industry. In the Spring of 1989, SDCC approved the RCC project, and project planning and implementation took place during that summer.

CASAS officials recommended that an RCC team first be oriented to its system on site in California. Having experience with numerous adoptions under its National Diffussion Network grant, experience had shown this to be the most cost effective technique. SDCC officials requested RCC to share its training opportunties with counterparts from two neighboring community colleges -- Piedmont Technical, and Sampson. Both institutions had significant links with industries in their counties, and, although it was understood the grant could not support direct

technical assistance to their sites, they were welcomed by all involved. An SDCC official also accompanied the group from the perspective of possible statewide application.

In late September, the specialist conducted a one day orientation at RCC for those preparing to visit CASAS. The orientation included background information on CASAS and explored its relevance to workplace basic skills based on expereience and research findings. Two weeks later, the group underwent a four day training and planning session at CASAS and operating sites. One month later, CASAS' Director conducted a three day training and technical assistance visit at RCC for the same group. RCC's program is now underway with growing interest by SDCC and their counterpart institutions to a wider application of the competency based assessment and curriculum management system.

Conclusion

The RCC experience demonstrates a unique combination of positive factors resulting in a validated system being applied to the different requirements of workplace basic skills. Among these are:

Awareness by industry decision makers of the importance of basic skills requirements in meeting changing workplace demands.

An accurate assessment by these same decision makers that known models of assessment and instruction did not adequately address these requirements.

An institutional president and dean responsive to the needs of industry and agressive in seeking out new approaches.

State department education officials knowledgeable in accessing an appropriate specialist.

The existence of a validated program with leadership capable of making new applications to meet industry needs.

State educational leadership in demonstrating and assessing the relevance of the new application to statewide needs.

The RCC case can also be viewed as a case study in diffusing and adopting improved programs and practices in workplace basic skills. While the existence of a validated program in the National Diffusion Network was the most critical factor, knowledge of its applicability appears to have rested in a single person. An effort that relies on individual knowledge is likely to be wrong much oftener than right. An effective diffusion and adoption system would make this knowledge universally available, thus mitigating the element of chance.

A Joint Union/Corporate Perspective: SKILLS 2000

In June 1989, the UAW-GM Human Resource Center completed a two plant pilot program of its new interactive video disc program "SKILLS 2000." Designed to present the skill requirements of the future to the current GM workforce and to motivate needy workers to improve their skills, the pilot program evaluation concluded that "SKILLS 2000" does indeed accomplish those objectives1.

Jointly administered and staffed by United Auto Worker and General Motors professionals,2 in 1987 the Human Resource Center began discussions with Hudson Institute and U.S. Department of Labor (DOL) officials about a technologically-oriented workplace literacy project. About a year earlier, the Human Resource Center had completed installation of over 1,000 interactive video disc stations throughout approximately 150 plants and work sites. Installed to deliver a high intensity health and safety training program, the new hardware system provided an ongoing opportunity to deliver a wide range of interactive training programs.

In early discussions with the DOL, a Hudson Institute official suggested a $1 million project to develop a computerized program to teach basic skills. The UAW-GM team assigned to the project supported a basic skills program but favored an approach that would best use the new interactive video disc (IVD) technology. In a later meeting at the Hudson Institute in Washington, D.C., the group agreed upon an IVD motivational program that later came to be called "SKILLS 2000." Effective July 1, 1989, DOL awarded a two year $250,000 grant to be matched

by the same amount by the UAW-GM Human Resource Center. In the first quarter of 1988, the Human Resource Center contracted with the Center for Applied Linguistics in Washington, D.C. to assist in the developing the literacy program content and with Spectrum Interactive of Bedford, Massachusetts to design the architecture and the flow of content and treatment.

"SKILLS 2000," contained in a single video disc, has three parts. An introductory section presents the viewer with an overview of changes that have taken place in the auto industry and how future developments in technology and work organization will require a wide range of basic skills. The main second section, comprising about eighty percent of the entire program, provides employees with tests and lessons on sample skills in five categories: reading, writing, numbers, charts, and communicating. Menu driven, an employee not only can choose a single category but may select tasks in each of the five content areas at five levels of increasing difficulty. The third section presents information on available skill improvement and educational opportunities for GM employees. Screens about whom to contact for more information at each plant are included. Figure illustrates the overall design of "SKILLS 2000".

The pilot program evaluation "indicated strong employee approval for SKILLS 2000. Employees report that it did have the intended effect of causing them to reflect on their own current level of skills and to consider improving their skills."3 The strongly positive response further indicated that workers are highly receptive to this approach to promoting their own

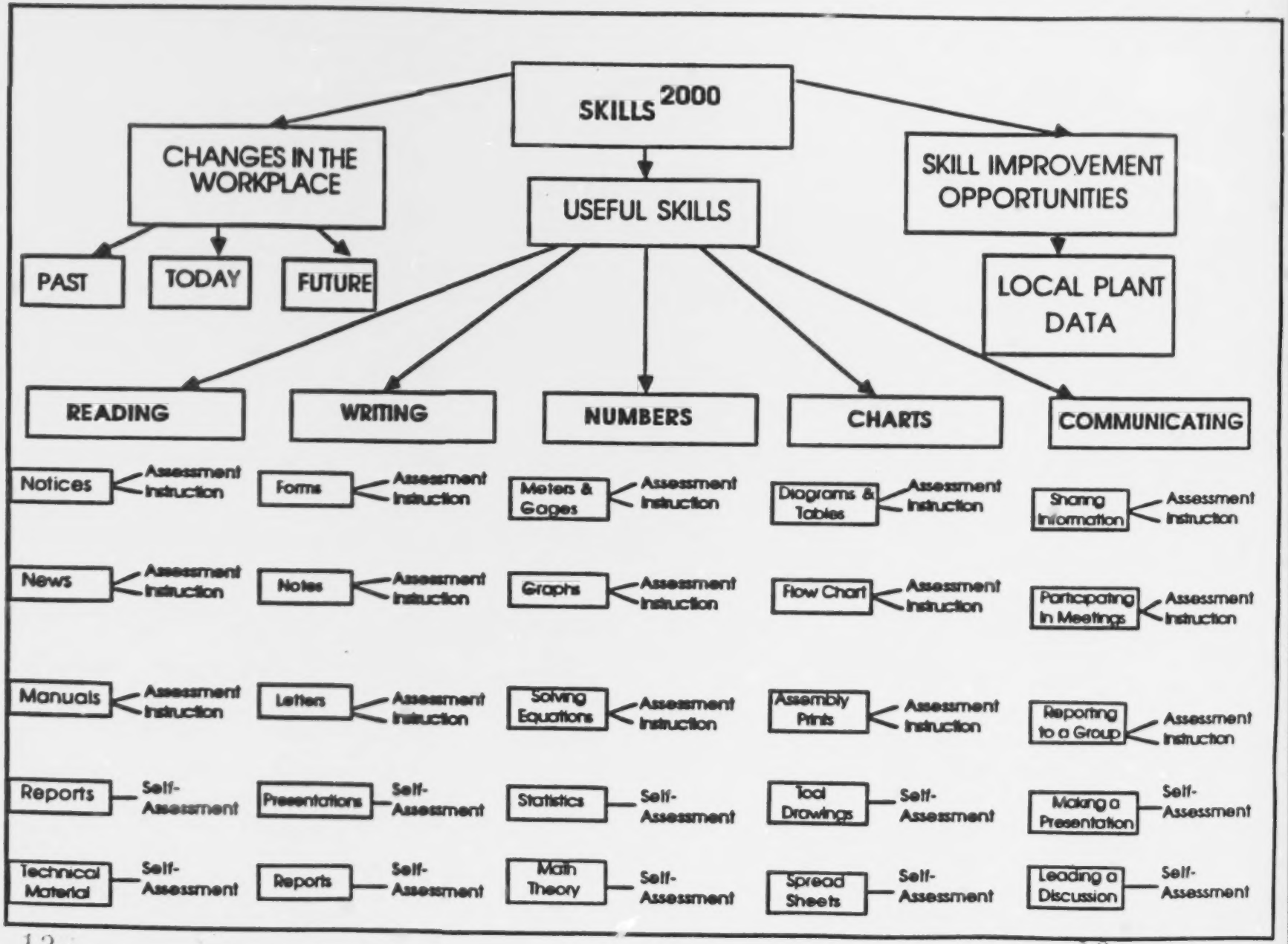
SKILLS 2000
CHANGES IN THE WORKPLACE
USEFUL SKILLS
SKILL IMPROVEMENT OPPORTUNITIES
PAST
TODAY
FUTURE
LOCAL PLANT DATA
READING
WRITING
NUMBERS
CHARTS
COMMUNICATING
Notices
Assessment Instruction
Forms
Assessment Instruction
Meters & Gages
Assessment Instruction
Diagrams & Tables
Assessment Instruction
Sharing Information
Assessment Instruction
News
Assessment Instruction
Notes
Assessment Instruction
Graphs
Assessment Instruction
Flow Chart
Assessment Instruction
Participating In Meetings
Assessment Instruction
Manuals
Assessment Instruction
Letters
Assessment Instruction
Solving Equations
Assessment Instruction
Assembly Prints
Assessment Instruction
Reporting to a Group
Assessment Instruction
Reports
Self-Assessment
Presentations
Self-Assessment
Statistics
Self-Assessment
Tool Drawings
Self-Assessment
Making a Presentation
Self-Assessment
Technical Material
Self-Assessment
Reports
Self-Assessment
Math Theory
Self-Assessment
Spread Sheets
Self-Assessment
Leading a Discussion
Self-Assessment

Figure 2

educational development. However, the report strongly emphasizes the importance of plant leadership "buy-in" before the program is put into use, and warns about using the program in isolation.

> SKILLS 2000 has the best likelihood of being effective when it is an element in a strategic plan for improving worker skills. When used in isolation it will be less effective in causing significant changes in the skills and education level of the employees. If SKILLS 2000 is thought of as the answer to the problem of upgrading employee skills, it is unlikely to be of much consequence. If, however, it is thought of as a part of the answer, and a significant part, it shows potential of making a valuable contribution.4

The fact that SKILLS 2000 was jointly developed by union and management in a well established climate of joint administration of worker training is an important variable in the success of SKILLS 2000 within GM. When the evaluator refers to "plant leadership," this includes both UAW and GM officials, especially as co-decision makers in Joint Skills Development Committees in each plant. Made up of the highest levels of both union and management plant leadership, these committees are in a position to develop a strategic plan for worker training in which SKILLS 2000 can be part of the answer.

With the verification and guidance provided by the evaluation report, the UAW-GM Human Resource Center is moving forward to implement SKILLS 2000 throughout GM. As it does so, it is giving new attention to the type and quality of basic skills education available at its plants. At present, the Human Resource Center has engaged two vendors to assist in making quality competency based basic skills available to local plants and work sites.

Although the first and third sections of "SKILLS 2000" are specific to GM, the main second section is generic. The

overriding theme of preparing oneself for the workplace of the future is equally generic, as the title suggests. Thus, "SKILLS 2000" appears to be readily adapatable to other work contexts and, omitting part three, may be a valuable motivational program for high school youth and young adults. At this time, the major limitation in exploring these applications is the absence of compatable hardware systems.

III

TOWARD A JOB RELATED BASIC SKILLS SYSTEM

The current crisis in worker basic skills is attributable much more to changes in workplace requirements than to a decline in the competencies of those in the workforce. Noting that the nature of literacy in the workplace has changed dramatically in the last few years, Mikulecky emphasizes that "there is a greater demand for both higher level literacy and more diverse literacy applications than in the past."1 Technological advances and new methods of organizing work are largely responsible for these higher level demands, and these demands will not only remain with us, they will continue to rise.

> It is important to understand that the impact of change will not be that all jobs will be high-tech, but that high tech will affect more jobs. Consequently, a higher level of literacy skills will be needed to enable workers to perform a wider range of duties and to move from task to task and duty to duty.2

In analyzing the impact of the automated workplace on functional literacy, Conklin and Reder noted the impact of technology on functional communication skill requirements. In a 1984 study of the full range of office workers -- clericals and technicals as well as managers and professionals -- in a partially automated office, they found that employees throughout the organization spent almost three-fourths of their time communicating: 9.8 hours weekly in face-to-face interaction, 7.5 hours reading and writing documents for correspondence, 5.6 hours on the telephone, 5.4 hours in scheduled meetings, and 1.5 hours using electronic mail.3 Furthermore, electronic messaging and

conferencing, increasingly commonplace in the business office, are giving new dimensions to writing that go beyond conventional assumptions about the purposes of writing.

> With the advent of computer-mediated communication, literacy has finally become a channel with synchronous, or dialog, capabilities. That is, users of electronic messaging and conferencing systems can send written material back and forth instantaneously. Thus literacy has entered a new era: writing is no longer a channel restricted to one-way communication. Electronic messaging and conferencing can function interactively, serving a group of participants as would the exchange in a face-to-face conversation or a telephone call. Interactive literacy will require adjustments in our understanding of the technical skills for writing, the range of writing's functions, and the social values attributed to the written word.4

Noting that the video screen requires different techniques from the printed page, they conclude that reading and writing skills are perhaps growing more complex as a consequence of automating the office workplace.5

Building for Successful Learning

Programs that are to achieve success in providing workplace basic skills must first recognize the differences in job related skill requirements -- differences of level, complexity, purpose, and frequency -- from those of general or academic basic skills.6 To teach workers general basic skills on the assumption that the new skills will transfer to job skills will not produce the intended effect. "Traditional teaching of reading and writing to adults, like that in secondary schools, seems to have little transfer to the workplace."7 Although adult education programs differ from secondary school programs in materials and methodologies, those that follow a traditional skill building

pattern leading to a high school equivalency diploma likewise have little transfer to the workplace. But all adult education programs do not teach basic skills in a purely or predominantly academic context. The Adult Performance Level (APL) Study (1975) was designed to identify adult life basic skills and applications of those skills to adult knowledge areas, including an area called "occupational knowledge." Extended by experimental and development projects in many states, a non-traditional body of knowledge and practice commonly referred to as competency based adult education programs exist throughout the United States. A vital question is, what is the relationship of these programs and their effects to the requirements of workplace basic skills?

Figure 3 has been constructed to better explicate the differences and relationships between general basic skills and job related basic skills. Sticht's dichotomy of reading, writing, and computing to learn versus reading, writing, and computing to do is used to summarize the essential differences in school based or academic basic skills and workplace basic skills. In Figure 3, the left hand axis represents a purely academic approach to basic skills designed to make the learner proficient in academic settings. The right hand axis contrastingly represents a purely job related basic skills approach designed to make the worker proficient in quite specific workplace settings. Both axes are portrayed as equally effective in their ideal execution while diametric in their purposes and requirements. Thus, as one approach diminishes in its ideal execution, it contributes to the increased realization of the opposite purpose.

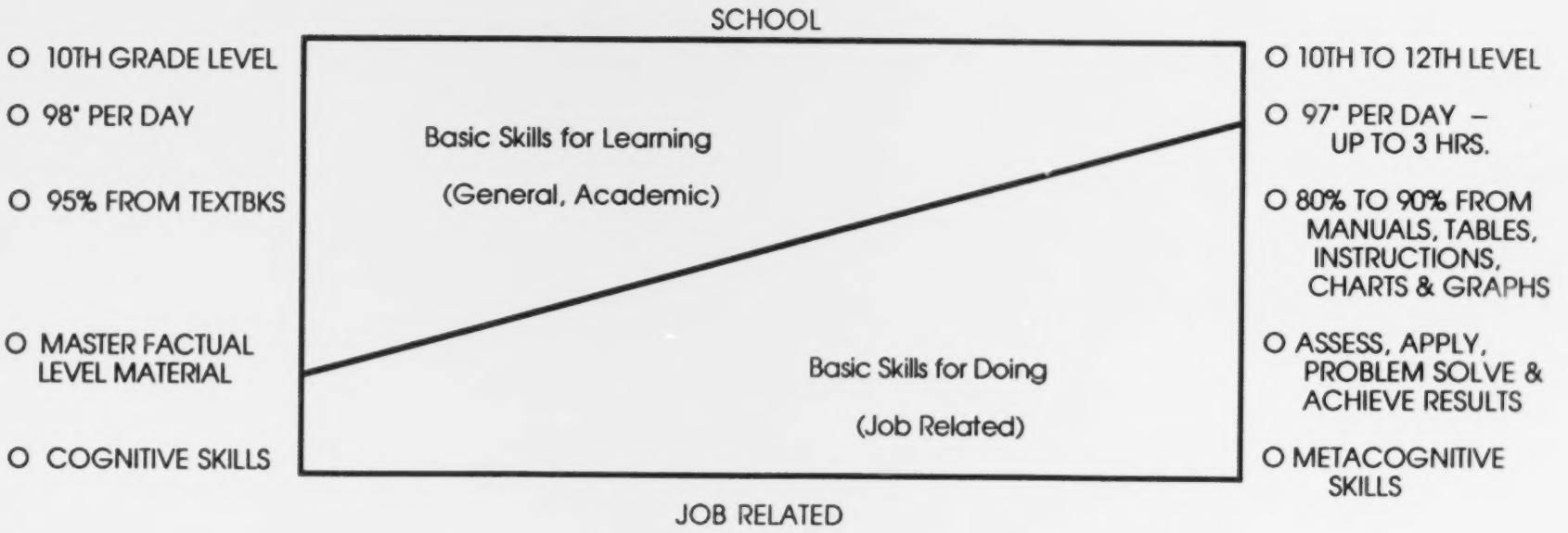
SCHOOL
O 10TH GRADE LEVEL
O 98* PER DAY
O 95% FROM TEXTBKS
O MASTER FACTUAL LEVEL MATERIAL
O COGNITIVE SKILLS
Basic Skills for Learning
(General, Academic)
Basic Skills for Doing
(Job Related)
O 10TH TO 12TH LEVEL
O 97* PER DAY – UP TO 3 HRS.
O 80% TO 90% FROM MANUALS, TABLES, INSTRUCTIONS, CHARTS & GRAPHS
O ASSESS, APPLY, PROBLEM SOLVE & ACHIEVE RESULTS
O METACOGNITIVE SKILLS
JOB RELATED

Figure 3

While an admittedly oversimplified portrayal, it is offered here to clarify differences and relationships with no intention to elevate or denigrate either purpose.

Along the left hand axis, the bulleted statements summarize the characteristics of secondary level education for youth; those on the right hand axis summarize Sticht's and Mikulecky's findings on workplace literacy requirements.

In Figures 3 through 9, different curricula and assessments are indexed in relation to certain zones of the dichotomy. These zones are illustrative only. They are designed to make valid distinctions relative to one another and to denote relationships. They make no claim to precision in where their demarcations fall on the spectrum.

Zone 1 contains traditional ABE and GED curricula designed to teach general basic skills to adults, utilizing cognitive skill-building curricula and standardized normative tests including the GED examination. Zone 1 represents the traditional and dominant basic skills programs for adults designed to develop proficiency in academic skills equivalent to a high school graduate.

Zone 2 also represents traditional high school equivalency programs; however, in this zone innovative teachers supplement the high school equivalency content and format with real life problems and materials (such as sale adds or help wanted notices in the newspaper). Still in zone 2 but slightly more related to the workplace are computational problems and job reading materials generic to the work area or even specific to an

PROGRAM ZONES

- COGNITIVE SKILL CURRICULA
- STANDARDIZED TESTS

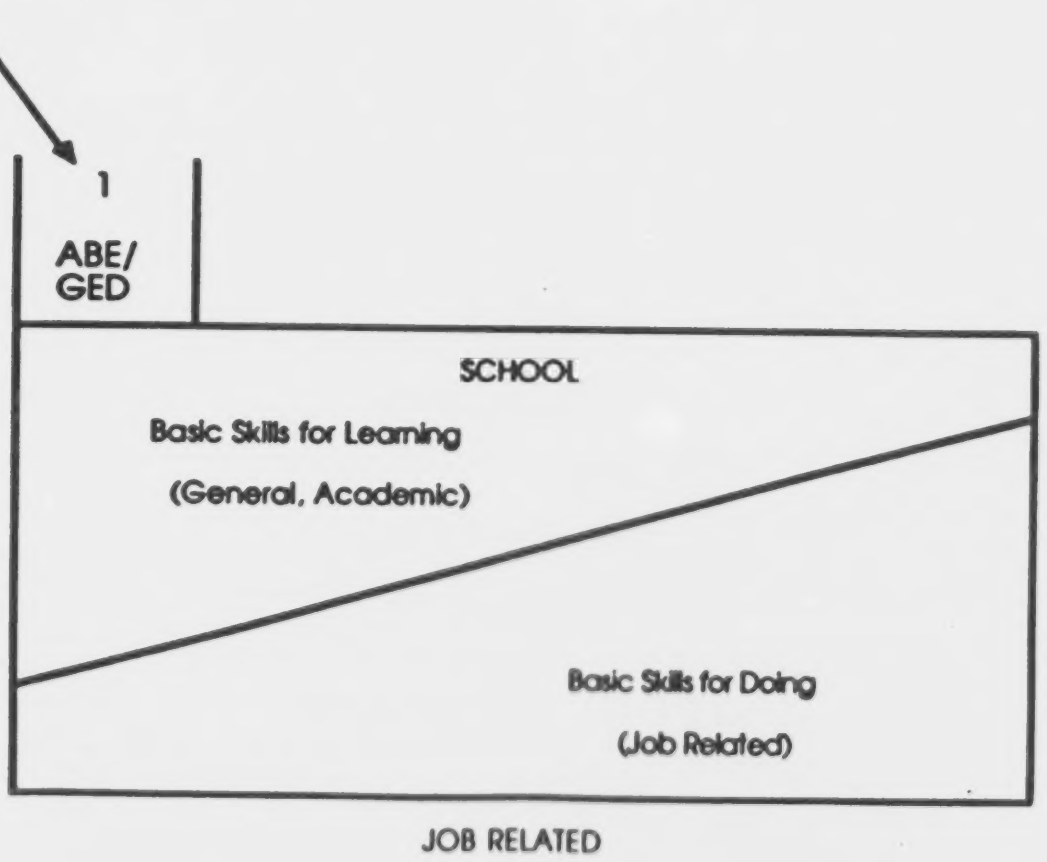

Figure 4

PROGRAM ZONES

- #1 PLUS JOB & LIFE RELATED MATERIALS & PROBLEMS
- STANDARDIZED TESTS

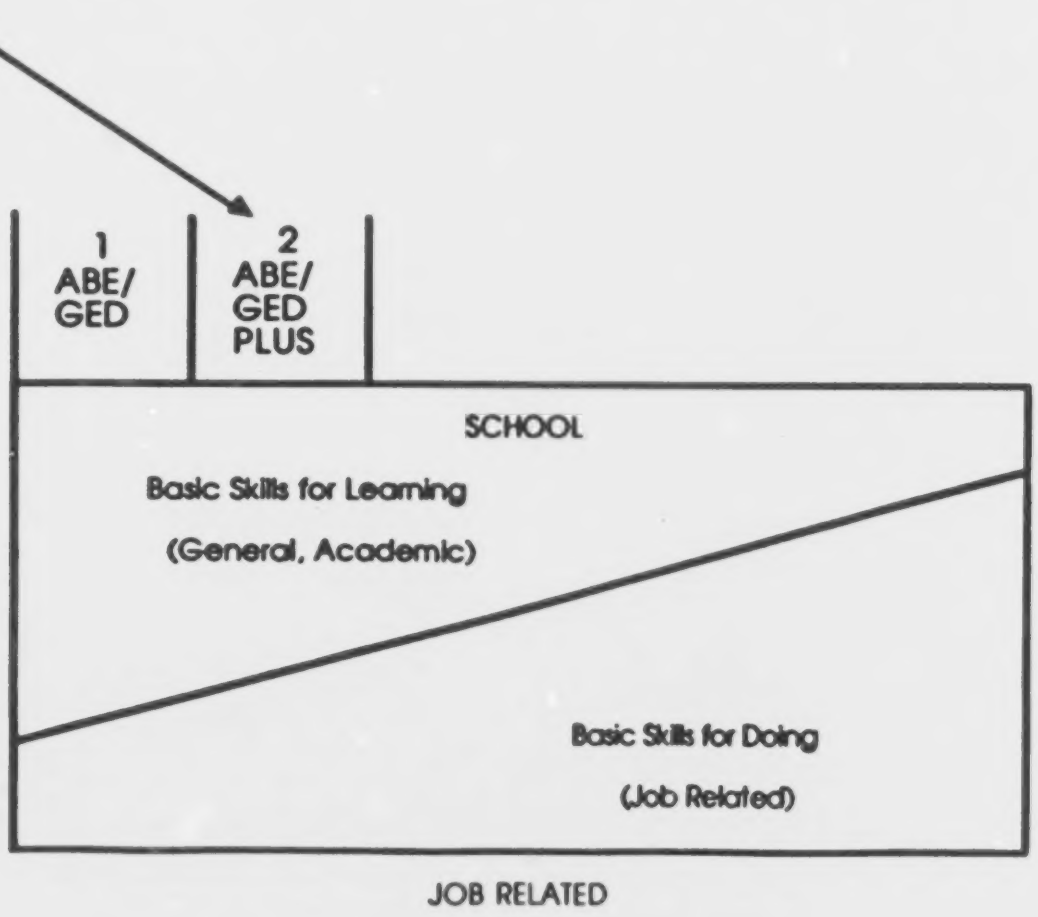

Figure 5

individual's work station. However, at this point, these materials and problems are not used as the organizing principle for the sequential development of basic skills, only as supplements to the traditionally formatted sequence for learning academic basic skills.

Zone 3 represents programs in which job and life requirements are used as the organizing principle in curriculum development. Programs in this zone do not follow the traditional skill-building pattern of the high school equivalency format. At this point, basic skills for doing replaces basic skills for learning. Work and real-life competencies in domains such as statistical process control, interpreting work manuals, consumer economics, health, parenting, getting a job, using community resources, and understanding government and law, are the what to be learned, and they are learned by applying basic skills in situations related to these domains. From a curriculum viewpoint, programs in zone 3 meet the learning requirements of the workplace if the learning settings and applications are primarily work contextual. However, as most often encountered in programs studied, they fall short in using standardized normative tests designed to measure proficiency in academic basic skills. Thus, from a workplace effectiveness perspective, they would be graded "A" for curriculum content but "F" for testing and assessment. On the one hand, zone 3 programs teach skills for doing, but they measure only skills for knowing. To measure something different from what is learned is dysfunctional. It may denigrate what has been learned and falsely assess what needs

PROGRAM ZONES

- WORK CONTEXTUAL
- STANDARDIZED TESTS
- MAY NOT FOLLOW GED FORMAT

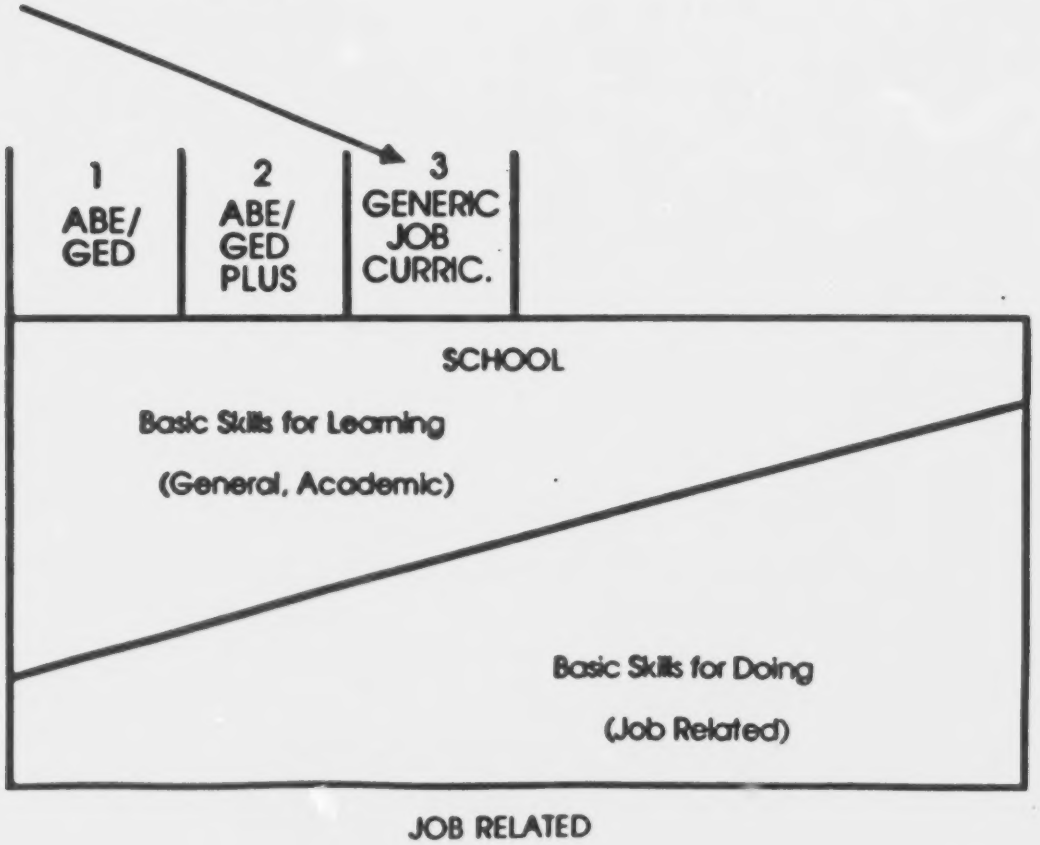

Figure 6

to be learned.

Zone 4 is made up of programs that identify, assess and teach life competencies. In curriculum content and methodology they may be identical to programs in zone 3, but they use criterion referenced assessment instruments and techniques to diagnose learner needs, monitor learning progress, and to verify that the needed basic skill competencies have been mastered. As categorized here, zone 4 programs do not attempt to address specific job related needs, although existing programs in zone 4 typically address competencies required to find and obtain jobs and to function safely in work environments.

Zone 5 programs are identical to zone 4 except in content and applications. Zone 5 programs teach generic workplace basic skills in work contexts, using criterion referenced assessment for diagnosing learning needs, monitoring progress, and verifying that the required basic skill competencies have been mastered. Finally, programs in zone 6 closely resemble those in 5 except that the content is directed to mastering competencies related to performing specific jobs and tasks.

In Figure 9, program zones 4, 5, and 6 are designated "competency based." A few words of clarification are in order. This phrase has been in common use among adult basic educators since the late 1970s. It is incorporated in a section of the American Association of Adult and Continuing Education (AAACE) as the Competency Based Adult Education (CBAE) unit. CBAE attracts and supports adult educators practicing in zones 2 through 6. From a curriculum and instructional point of view, this is a

PROGRAM ZONES

- o MEASURABLE ADULT COMPETENCIES
- o VALIDATED ASSESSMENT
- o VARIGATED CURRICULUM

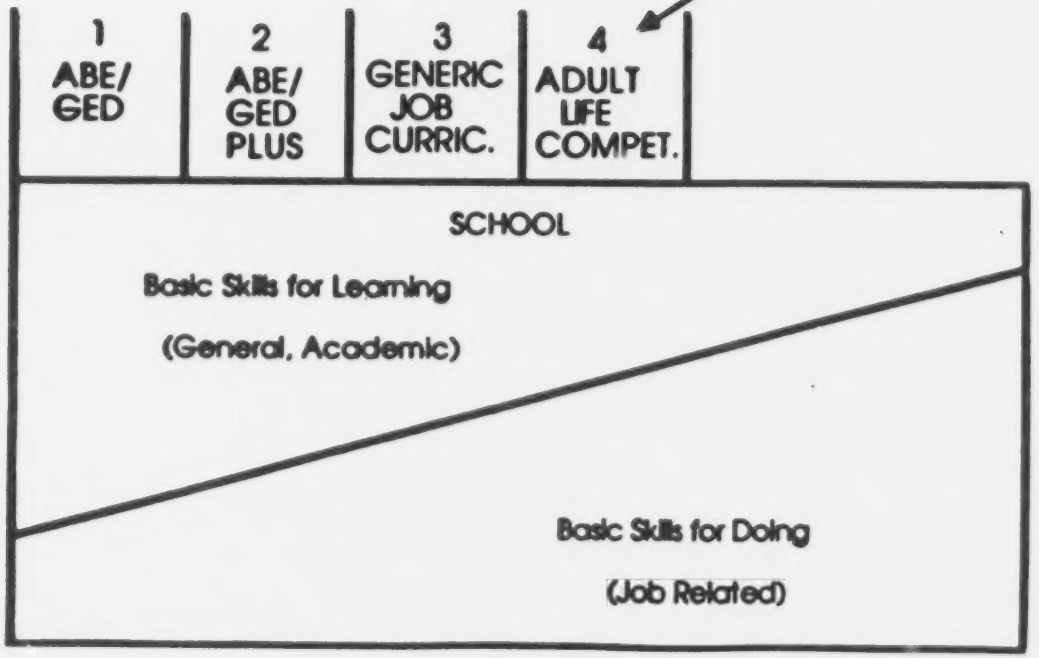

Figure 7

PROGRAM ZONES

- MEASURABLE WORKPLACE COMPETENCIES
- VAIDATED ASSESSMENT
- WORKPLACE CURRICULUM

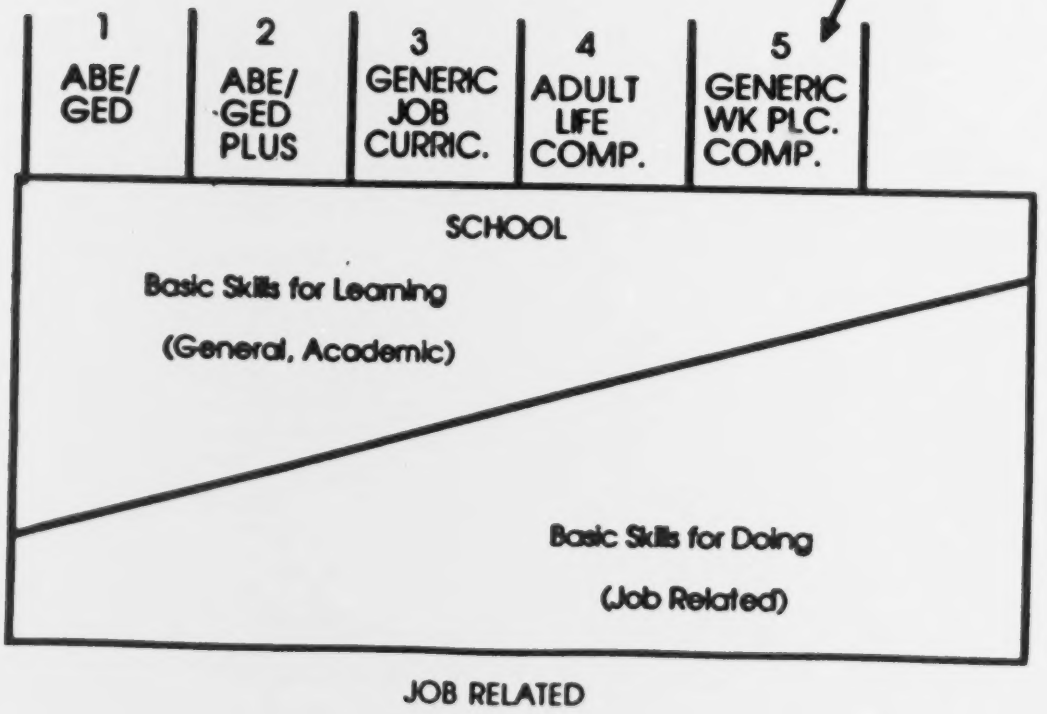

Figure 8

legitimate use of the term "competency based." However, from a total learning system perspective -- the one treated here -- programs in zones 2 and 3 are not competency based because of the absence of criterion referenced assessment techniques and instruments for diagnosing, monitoring, and verifying mastery of basic skill competencies.

A discussion of these program zones in relation to programs studied will hopefully illuminate both the programs themselves as well as the zones. Non-customized "GED programs" such as those offered at Plumley Company, and earlier programs in Connecticut and by Rockingham Community College fall into zone 1. As such, they offer very little transfer value to workplace basic skills -- skills for doing. Aetna Institute programs offer an interesting array. The evening basic skills program is in zone 1 (or zone 2 in the hands of an innovative instructor); its Effective Business Skills program is designed to be a zone 6 program while its general skills program is aimed at zone 5. (In the time available, it was not possible to determine whether these latter two programs actually incorporate valid and reliable criterion referenced testing and assessment).

The Governor's Initiative program in South Carolina is designed to be competency based and to address zones 4, 5, and 6, but the absence of applied criterion referenced testing and assessment results in programs that are actually in zones 2 and 3. All of Connecticut's programs are now scheduled to become zone 4 and 5 programs in 1990, while the New York Finger Lakes Regional Education Center programs are classic zone 3. Some of

PROGRAM ZONES

- o MEASURABLE JOB COMPETENCIES
- o VALIDATED ASSESSMENT
- o JOB SPECIFIC CURRICULUM

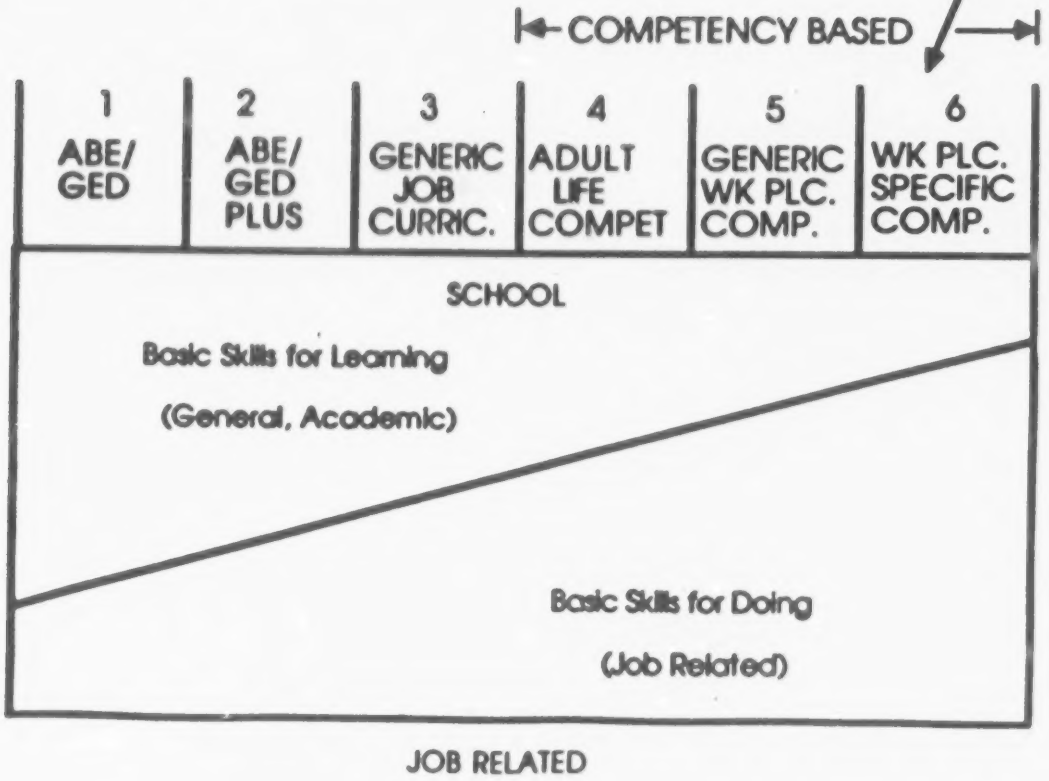

Figure 9

their customized job specific programs in SPC and other areas are zones 5 and 6 in curriculum content but lack criterion referenced testing and assessment.

Houston Community College workplace programs fall into two zones. The customized workplace programs and its workplace literacy grant program are in zone 3. The generic GED programs are sophisticated zone 2 programs in accordance with the curriculum guidelines promulgated by TEA.

Rockingham Community College's developmental program will result in true zone 4 programs. If future opportunities result in applying the new programming competence to a work setting, zone 5 programs will develop. If the Miller Brewing Company program had materialized, it might have been a zone 5 and 6 "first."

The distinctions between zones 4, 5, and 6 provide a useful framework for clarifying factors in an optimal workplace basic skills learning program. One of these factors was addressed in material quoted from David Mathes, namely, that job specific requirements change so rapidly that generic job basic skills are preferable to job specific ones. His point is well made. But the point also is to be made that, especially in programs designed to increase competence to meet <u>future</u> workplace requirements, generic life competencies that can be immediately applied are more likely to prepare workers for the future than are generic job competencies that have no immediate application. The key to retaining and extending basic skills for <u>doing</u> is continual application. If application in the workplace is not

immediate -- or at least imminent -- the skills will be better learned and retained within contexts of adult life in which they can be immediately and repeatedly applied.

Mikulecky's identification of metacognitive skill requirements for adults is not limited to the workplace. The real world demands metacognitive skills in order to function in all major domains. Adult life competencies in general, then, are relevant both to preparing for functional competence in the workplace and for functioning in other areas of adult life. They are especially relevant to the workplace if the application of metacognitive skills in the workplace is a future rather than an immediate requirement.

> Almost any non-school application of literacy which solves realistic problems and involves reading materials will provide practice in using metacognitive skills and will expand learners' background knowledge of different sorts of print materials. To the extent that instructors can model how to use print to solve these realistic problems, valuable instruction and transfer is likely to occur.8

Zone 6 programs are appropriate when new technology and processes urgently require improvements in workers' basic skills, but in most situations, the optimal workplace basic skills program will be a blend of generic workplace and life competencies (zones 4 and 5), taking from each competencies that can be applied immediately or in the near future.

Supporting Successful Learning

Programs described in this study not only provide useful data for identifying successful learning programs but also illustrate the importance of supportive factors, the presence or absence of

which can significantly determine program outcomes. These supportive factors will be analyzed from four perspectives: employer support, union support, state support, and federal support.

Supportive Employer Roles

Among programs studied, those most successful from the employer's viewpoint were often more a manifestation of employer commitment to learning than examples of exemplary learning programs. Employers who value learning for all employees and who take a strategic view of training and education can create a corporate or company culture that both motivates and sustains worker learning. Plumley Companies' commitment in fact and in its ten point management plan is one case in point: "We must recognize the need for change in our own lives and improve our Education. The level of performance of every employee must be upgraded just To Preserve Opportunities to serve our customers." Although its basic skill offering is from the least effective Zone 1, employer and employees alike value learning and see continual worker improvement strategically related to company success and worker satisfaction.

In South Carolina, management's commitment at IBIS "to keep operators and resource people abreast of our fast-changing technology" and its history of proactive learning are critical contributors to a well designed in-house program boasting 96 percent success on a voluntary basis. Contrastingly, a well designed Zone 3 program at a poultry company plant in that same state was almost without success because of a lack of support by

plant management.

Aetna's well confirmed commitment to strategic learning through its Institute programs is a silent but essential factor in the success of its evening voluntary programs. The Aetna Institute not only provides well designed learning programs; it also manifests to employees that learning is to be a shared way of life and an essential path of individual and corporate progress. Milliken Company, on the other hand, does not see an educated workforce as vital to its future and profitability, and along with some other textile companies, views its basic skills program in the context of meeting a "moral obligation."

In the workplace, one of the most important factors in basic skills program success is a company or corporate culture that values and supports learning strategically and proactively. Individuals motivated to learn sometimes overcome barriers that would otherwise frustrate and discourage learning. However, it also follows that organizations so committed to learning characteristically provide greater access to and support for that learning, although in several cases cited, that did not include release time for learning.

Arguments in favor of release time are compelling: learning is more convenient, can take place when learners are not too tired, can be more intensive and produce results faster, does not require extra support services such as transportation and child care, and is itself a strong manifestation of management's commitment to and support for learning. Nevertheless, in some of the programs reviewed, significant success was reported when

learner time was entirely voluntary.

Reward and promotional techniques used by employers are also significant variables in supporting programs. Certificates, award dinners and -- although not encountered among programs reviewed in this study -- cash bonuses for basic skills achievements are among the strategies currently in use. Rather than single out one or a specific set of such techniques, it may be more accurate to advocate that employers committed to improving the basic skills of their workers give careful attention to comprehensive support strategoes appropriate to their situation and the needs of their employees. What these manifestations are may not be as important as how they are perceived by employees and certainly are not as significant as the actual learning gains achieved.

Supportive Union Roles

Among unionized companies reviewed in this study, two took strongly proactive roles in promoting basic skills. AFL-CIO Local 1550, in partnership with Houston Community College, is promoting the career opportunity program and actively recruiting its members. In these roles, it is creating a "culture" across groups that promotes the importance of basic skill improvement and career readiness. The current leadership was not in office when the program was conceived but have responded to informal coaching by HCC's project director. The first union/public education program in Texas, it may suggest an increasing role for local unions in promoting basic skills education among members.

In contrast, the "SKILLS 2000" program is an extension of the

UAW-GM joint effort that first emphasized job related training for skills trades workers. In the 1987 National Agreement, among the duties and responsibilities ascribed to the National Joint Skill Development and Training Committee was one to identify "needs for active employees in the areas of basic education, job-related and interpersonal skills."9 The addition of basic education as a need came first through its dislocated worker programs and secondly with active workers. "SKILLS 2000" is one of the first programmatic responses to recent basic skills requirements.

In other programs reviewed, the role of the local union was consistent with its current relationship with management. If that relationship was constructive, so was the union response to a basic skills initiative by management. If the relationship was adversarial and suspicious, a management sponsored basic skills initiative met with the same response. It is clear that a supportive role by unions can make a significant contribution to a workplace basic skills initiative, but that role will be determined more by the quality of the current union/management relationship than any other factor.

This study is not intended to be representative of union roles in workplace basic education programs. Both the literature and the practice of workplace basic skills programs identify some outstanding efforts by unions in providing basic skills education for their members. In some programs, they create a "learning culture" among their members that equals any described here. In one state studied -- New York -- unions have been successful with

their legislature in obtaining a special appropriation for union basic skills programs.

Supportive State Roles

Funding Patterns - Especially among small and medium sized employers with little or no training budgets, the availability of state funds to cover instructional costs can be the critical factor in whether basic skills programs are available. At present, fifteen states10 are known to have formula funding that can be used to cover workplace basic skills instructional costs. Where these formulas exist, they encourage educational systems to be proactive in seeking to meet the new and emerging basic skills needs of the workforce. The prospect of generating new funds for instructional programs often makes it feasible for an educational institution to underwrite professionals who can initiate contacts with employers and customized programs to most effectively meet workers' needs. Without such formulas, an institution's considerable capabilities may remain a "best kept secret," even when some employers can and will pay training costs.

Despite successes cited in which employees learned entirely on their own time, educators and employers agree that release time programs meet needs more effectively and rapidly. Release time costs frequently amount to between five and ten times instructional costs. If states are interested in their own economic well-being, it is in their self-interest to provide funds for workplace basic skills, much the same as they do for the education of their future workforce: children and youth. And as with children and youth, state formula funding provides the

flexibility needed to respond to demographic and economic variables.

Special population needs may require categorical programs, but they should supplement formula funds. In the case of union basic skills appropriations in New York, these funds are applied where formula funds are not available through the established educational conduit, thereby supporting direct basic skills programs by unions.

Administrative arrangements - Workplace basic skills are first and foremost an economic need. It is important, therefore, that funds and services be provided by those best able to deliver them. States in which workplace basic skills training is administratively linked with state economic development efforts are best able to monitor educational need and provide customized programs. A critical factor in successful workplace basic skills delivery is the ability of developers and educators to understand and interpret employer training needs. This is best accomplished through institutions that have a tradition and pattern of serving employer. New York's linking of its adult education and economic development centers is a model to be studied as are states in which workplace basic skills training is provided through community and technical colleges.

State Leadership - Leadership patterns are easier to identify after the fact than they are to forecast. South Carolina's gubernatorial initiative with its statewide strategy for orchestrating effective services is a promising pattern. In New York, regional education and economic development centers are

effectively proactive in meeting workplace needs. In North Carolina, state department of community college officials are energetically pursuing new program approaches to help their institutions best meet workplace literacy needs. Connecticut adult education administrators are converting programs statewide to better meet the requirements of those in the workplace as well as those not in the workforce. While patterns in other states may vary, leadership is needed in every state to create new authorities and mechanisms that will effectively address workplace basic skills requirements -- both present and future.

Supporting Federal Roles

Stimulating State Resources - While awareness of workplace basic skills requirements is growing among some state leaders and officials, among others there is a clear lack of urgency. In other cases, there appears to be a lack of knowledge of existing state policies and administrative arrangements that are effective in some states. All states could profit from carefully targeted demonstration projects aimed at developing systems of integrated basic skills and services. Evaluations of economic returns to states with effective basic skills programs are possible and could go a long way toward convincing state officials and legislators of the cost benefits of a qualified workforce.

Generating Knowledge and Resources - Some of what is known about workplace basic skills comes from federally supported research, principally directed to military occupations. Much more needs to be known, especially in relation to rapidly changing technology and new strategies for organizing work.

Current considerations toward a national center for adult literacy should include a coordinated research and demonstration effort on both workplace and academic basic skills. Especially needed are new criterion referenced instruments and techniques directed to assessing workplace basic skills competencies along with people expert in applying criterion referenced principles to changing workplaces.

Promoting Effective Programs and Practices - Much more needs to be known about workplace basic skills, but, more importantly, what is known needs to be diffused to planners and practitioners, adapted to present requirements, and extended in applications. State sub-systems for diffusion and adoption need to be generated and these nourished with a continuous flow of improved practices and products gleaned from research and practice. Only a national initiative can accomplish these objectives -- a clear indicator of a proper federal role.

IV

FACTORS CONTRIBUTING TO SUCCESS OR FAILURE

In meeting education and training requirements, there is always a temptation to identify the "perfect" solution, a one-program-solves-all-problems approach. Often, it takes the form of a search for the perfect curriculum through which learning becomes easy and all requirements can be met. The most important factor in success is unquestionably to rid oneself of any such illusion, especially when addressing workplace basic skills in a technological society.

Successful workplace basic skills programs are the result of sets of interactive factors. In this study, these have been identified in two major categories: learning system factors and support system factors. In this section, both sets of factors will be summarized in two scenarios -- a best case and a worst case.

The Best Case

LEARNING SYSTEM FACTORS

- o Competency based curriculum
  - -- Teaches basic skills for doing
  - -- Work and life basic skill competencies
  - -- Specific job basic skill competencies as required
  - -- Curriculum and materials are from job and life contexts
- o Criterion referenced assessment
  - -- Measures work and life basic skill competencies already acquired

-- Monitors progress in new basic skill competencies learned

-- Verifies mastery of required basic skill competencies

o Learner centered instruction

-- Individual counselling and regular feedback

-- Flexible instructional format: individual, group, etc.

-- Variegated curriculum using print, instructional technology, simulations, etc.

-- Learning format accommodates individual learning styles

SUPPORT SYSTEM FACTORS

o Employer/Union Roles

-- The learning culture an essential element of work

-- Learning important to quality, competitiveness, and job security

-- Release time for learning basic skills

-- Instruction on premises in suitable facility

-- Continual promotional program using publicity, awards, certification, and recognition.

o State Roles

-- Formula funding to support workplace basic skills programs

-- Special population funds for qualified providers

-- Workplace basic skills linked with economic development initiatives

-- State leadership at all levels seek to meet employer basic skill needs

o Federal Roles

-- Workplace basic skills a national concern

-- Supports aggressive research and demonstration program to

improve knowledge and practice

-- Supports a system of evaluation, diffusion, and adoption of improved practices and products

This best case scenario represents an ideal, but not an unachievable one. All the learning system factors delineated exist in practice today but are rarely brought together in a single program. Employer/Union and State role models exist and can be replicated widely. Current proposed federal legislation seriously addresses the required federal roles.

The Worst Case

LEARNING SYSTEM FACTORS

- o Traditional high school equivalency content and format
  - -- Teaches basic skills for learning
  - -- Traditional subject matter content
  - -- No job or life related materials introduced
- o Standardized, normative testing
  - -- Ranks workers in relation to children and youth in school
  - -- Verifies primarily one's ability to learn at post-secondary education level
- o Teacher centered instruction
  - -- Traditional teacher/learner relationship without individual counselling and feedback
  - -- Group classroom format only one available
  - -- Single standard curriculum
  - -- No recognition of individual learning styles

SUPPORT SYSTEM FACTORS

- Employer/Union Roles
  - -- GED preparatory program only available basic skills instruction
  - -- Offered for individual's development and satisfaction
  - -- No clear relationship to quality, competitiveness, and job security
  - -- Conducted on employee's own time
  - -- Minimal publicity; no proactive promotional campaign
  - -- Little or no recognition of successful completion
- State Roles
  - -- No formula funding to support workplace basic skills programs
  - -- What funds available channeled through traditional educational institutions lacking experience in serving employers
  - -- Economic development measures separate or non-existent
  - -- State leadership measures accomplishments only in terms of high school equivalences awarded
- Federal Roles
  - -- Workplace basic skills a state problem
  - -- No federal support for research and demonstration to improve knowledge and practice in workplace basic skills
  - -- No support to evaluate, diffuse, and adopt best practices and products

Unfortunately, the worst case is both achievable and quite common. Usually well intentioned, such efforts languish and often die because of lack of learner response. Typically, a

program approaching the worst case scenario will attract a small class of learners whose personal or career aspirations are supported by high school certification. Beyond that, employers will ask how to motivate others, and eventually abandon the program because of lack of interest. Employees' silence is significant, but educators and employers do not understand why the program offered is not viewed as relevant to their work needs.

In presenting these cases, no attempt is made to include cost effectiveness as a factor because reliable, generalizable data are not available. The worst case scenario cannot be cost effective in reaching the large number in need who are not attracted to it. But many programs failing to meet the best case scenario are judged to work for significant numbers. This suggests that a program may be "successful" and be less than ideal.

Success in workplace basic skills must be judged in terms of what is learned and by how many in need. Assessing the "what is learned" requires valid and reliable criterion referenced -- i.e. job and life related -- measures. While these do exist, they are not widely in use. Until they are, reliable measures confirming that the kinds of workplace basic skills needed are in fact learned will not be forthcoming. As a result, other estimates of success -- some of which may be valid -- are often used. These include anecdotal data on changes in employee behavior, rates of employee participation, and judgments that basic skills instruction was a factor in improved efficiency and productivity.

If employers and educators feel those data are sufficient, the program is considered "successful." It may in fact be cost effective judged against the consequences of doing nothing -- loss of quality, market share, and jobs. However, in building a successful workplace basic skills system, both policy makers and educators must strive to be as quality conscious and cost effective as the workplace itself. Valid and reliable measures of what is learned are the educator's "SPC." They must form and maintain a quality workplace basic skills learning system.

A Postscript

In Defense of Adult High School Equivalency

The task of this study has been to review workplace basic skills research and practice and identify factors contributing to success. Because high school equivalency/GED programs are the current dominant mode available to workplace adults, their relevance to workplace basic skills requirements had to be reviewed and analyzed. The fact that that relevance is scant and that more effective programs for workplace needs are available is not to say that equivalency programs should be discontinued. They are designed for and accomplish a different purpose. That purpose can best be illustrated by pointing out its relevance within a workplace context.

If the purpose of this study had been to identify viable career development paths for hourly workers aspiring to technical and professional positions, the GED high school equivalency path would likely have been the preferred course. Technical and professional positions usually require intensive learning at the post-secondary level for two, four, or more years. To be successful in that effort, the student must be proficient in basic skills that enable him or her to learn in the manner required at the post-secondary level. The GED/high school equivalency certificate verifies that an adult has that proficiency. Thus, the equivalency certificate is a very important construct for sustaining an educationally mobile adult population. It should be cherished and continued!

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1 In this perspective, I am endebted to Wendell Fletcher of the Office of Technology Assessment who accompanied me on the field investigation. He shared with me his insights and notes from which I have drawn generously.

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10 In a 1989 survey of states by the U.S. Department of Education's Division of Adult Education, out of 36 states responding, 13 reported having a full-time-equivalency or average-daily-attendance formula for adult basic education. Among those not reporting, two states are known to also have such formulas. Connecticut, whose formula is not of this type, is also included here (see Connecticut Perspective), bringing the total to 15. These states are: CA, FL, GA, HA, MD, MA, NV, NM, NY, ND, OR, WA, WI, MI, CN.

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